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ABSTRACT

The study was designed to develop a model for the collection and analysis of cost data for defining the cost per pupil per program per type of school (area vocational or comprehensive). An advisory committee of New Jersey State Department of Education personnel and vocational educators was selected to provide unbiased input. The selected programs were practical nursing and health related occupations, each offered by different comprehensive high schools. The project proceeded according to 29 tasks illustrated in a flow chart. Five of the tasks, concerned with data collection using the model for calculating per pupil costs, were explained in detail. After review of the model and cost data, the advisory committee approved the model as reasonable for data collection. Five conclusions and six recommendations concerning use of the model are stated in the report. Appended materials (122 pages) include: definition of terms, advisory committee meeting materials, a two part literature review, task, task flow chart, cost of utilities (electricity), expenditures and cost computations for the two programs (for health occupations using the program budget accounting system and for practical nursing using the traditional accounting system). (Author/MS)

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MODEL FOR COST PER PUPIL

For Vocational Education Programs and Types of Schools

Final Report on a Pilot Project Conducted Under

Contract No. 27-4015

State of New Jersey SRES 101

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Charles R. Doty, Project Director

The Department of Vocational-Technical Education
Graduate School of Education
Rutgers University
The State University of New Jersey

June 30, 1975

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CE005 173

Model for Cost Per Pupil for Vocational Education Programs and Types of Schools

Abstract

Problem. One of the greatest problems of the vocational educator is the cost of programs. Such questions as: What is the excess cost of vocational programs? or What is the needed money to conduct an efficient and effective vocational program? are constantly asked. Those persons responsible for supplying data to legislators, fellow educators and the public are insecure and frustrated by their their lack of knowledge of accurate costs of programs.

Purpose of the Study. The purpose of the investigators of this study was to develop a model for the collection and analysis of cost data for defining the cost per pupil per program per type of school, e.g., area vocational school or comprehensive school. The specific objectives were:

1. To develop a review of the literature and an annotated bibliography.
2. To identify and define cost variables
3. To develop, test and revise a data collection model.
4. Report the findings.

Review of Literature. The investigators found in their inital investigation of literature on determining per pupil cost for programs that no systematic review was available. The decision was made to identify important research, divide these research documents among the investigators and produce a review of literature in two parts plus annotated bibliographies.

Definition of Terms. A definition of cost factor terms was completed.

Advisory Committee. An advisory committee was designed to provide the project staff maximum, unbiased input. To achieve the maximum breadth of input members were elected from the levels of State Department personnel to vocational teachers.

Sample. Data was collected in two counties in the State of New Jersey, two schools (one in each county) and one program in each school.

Methodology. The methodology consisted of twenty-nine tasks illustrated in a flow chart in the report. Tasks numbered twenty-two to twenty-six are explained in detail. These tasks concern data collection using the model for calculating per pupil costs.

Results. Cost data for two vocational programs were collected. However, the data only included the cost for one year, not the duration of a complete vocational program. The advisory committee reviewed the model and cost data. They approved the model as a reasonable data collection model. However, refinements of the model are planned in the second phase of the project.

Conclusions. After reviewing the literature, identifying cost variables, defining terms, collecting data and having the advisory committee critique the project results, the following conclusions were derived:

1. Program level cost per pupil constitute the greatest proportion of total per pupil cost when data is obtained from both program budget accounting system and the traditional administrative type accounting system.
2. Expenditures listed in program budget accounting system are more accessible than those listed in the traditional administrative accounting system.
3. Per pupil cost can be determined when available data is in the program budget and program accounting system and traditional administrative accounting system.
4. All levels of cost contributing to total cost per pupil are higher when ADA (Average Daily Attendance) is used as a base than when ADE (Average Daily Enrollment) is used. Using ADE gives more accurate costs.
5. Expenditures should be used rather than budget estmates for calcuating per pupil cost.

Recommendations. Based upon the experience of the project investigators and the expressed needs of legislators, N.J. State Department of Education, local school districts and the public, the following recommendations concerning the continuation of this project are given:

1. Data should be collected in occupational programs on a state wide basis in those educational institutions in which the New Jersey State Department of Vocational Education has primary concern, e.g., AVTS, Comprehensive High Schools, and Community Colleges.
2. The second part of the cost analysis model should be developed, i.e., the benefits or thorough and efficient dimension suggested by the Advisory Committee and which is essential to interpret the meaning of per pupil cost.

3. A manual should be developed to enable local administrators to collect adequate and consistent cost-benefit data.
4. Consideration should be given to the funding of dissertations concerned with program costs.
5. Cost analysis studies utilizing square foot computation of utility consumption by individual programs should be initiated.
6. The program budget accounting system should be adopted if an efficient methodology for calculating the cost of vocational education by program and per pupil is to be achieved.

Acknowledgments

The investigators of this project are grateful for the grant from the State of New Jersey, Department of Education, Division of Vocational Education and to the members of the advisory committee. Special appreciation is expressed to the officials of the school districts who granted the investigators the privilege of collecting cost data. Dr. George W. Harris, Jr. and Dr. O. Kenneth O'Fallon, The University of Tennessee, Knoxville, Tennessee, are also acknowledged. Their prior research was used as a guide in the instrument development as well as the project design.

Sincerely

Albert G. Gasior
Rose R. Kocinski
Charles R. Doty, Project
Director

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MODEL FOR COST PER PUPIL

INTRODUCTION

One of the greatest problems of the vocational educator is the cost of programs. Such questions as: What is the excess cost of vocational programs? or What is the needed money to conduct an efficient and effective vocational program? are constantly asked. Those persons responsible for supplying data to legislators, fellow educators and the public are insecure and frustrated by their lack of knowledge of accurate costs of programs. The present economic conditions - which may become the way of life with resources insufficient for the existing population - make it essential for the decision makers to have accurate data.

In 1974 the United States General Accounting Office reviewed the role of the use of Federal and state funds for vocational education. The purpose of the G.A.O. review was to insure that the use of Federal and state funds will be adequately evaluated at Federal, state and local levels. It would be appropriate if the G.A.O. would also examine funds used for all other areas of education, not just vocational education. However, the G.A.O. review at this time seems relevant because of the following factors:

1. The United States Congress is considering changes in vocational education legislation.
2. States are considering or have made changes in vocational legislation. For example, New Jersey has approved legislation that provides "for a thorough and efficient system of free public schools, a State aid program implementing such system." (Assembly, No. 2371)
3. Since the enactment of the Vocational Education Act of 1963, over three billion dollars of Federal funds have been expended.
4. Useful data that would be helpful in planning is unavailable, inadequate or unutilized.

The General Accounting Office Report [illegible] the Congress (1974) recommended the following to the Secretary, Department of Health, Education, and Welfare.

> . . . Greater attention to systematic, coordinated, comprehensive planning at national, state, and

> local levels would improve the use of Federal funds and better insure that vocational education is provided in a manner that best serves student and community needs. (p. 22)

PURPOSE OF THE STUDY

The purpose of the investigators of this study was to develop a model for the collection and analysis of cost data for defining the cost per pupil per program per type of school, e.g., area vocational school or comprehensive school. This purpose was derived from the factors stated previously. The specific objectives were:

1. To develop a review of the literature and an annotated bibliography.
2. To identify and define cost variables.
3. To develop, test and revise a data collection model.
4. Report the findings.

In addition to these objectives, two doctoral internships were provided allowing two vocational educators the opportunity to learn the complexities of funding.

SIGNIFICANCE OF THE STUDY

In New Jersey there is an essential lack of means by which vocational educators and administrators can accurately compute the cost of educating any one student in a given vocational program. This deficiency is not peculiar to this State. It is a national problem to which continuing research activity focusing on the identification and establishment of cost analysis techniques attests. According to the New Jersey Advisory Council on Vocational Education:

> . . . assessing the costs for Vocational Education within a school district is very difficult because no one really knows the true costs of vocational education. [I]t is nearly impossible for local districts to assess the actual cost of all of Education on a program by program basis because current accounting systems do not provide data for such assessment. (December, 1973, p. 40)

These observations are supported by the findings of the investigators in the recent national study titled Project Baseline which provides extensive data on costs and benefits of vocational-technical programs in all 50 states. The major factor contributing to the inability to obtain accurate vocational costs is the use of financial accounting systems which are designed to list appropriations and expenditures in ways that are useful to comptrollers and auditors of school budgets. "The greatest difficulty here is that records are organized along administrative budget lines so that the amounts spent on each portion of the [programs within a school district] cannot be directly picked out . . ." (Reinhart & Blomgren, 1969, p. 8).

School budgets in New Jersey and elsewhere across the country usually start with statements of need issued by teachers and principals and forwarded to the appropriate personnel involved with tabulating state costs and budgets. Need calculations start "with the existing base to which [are] added built in increments" (Crosse, 1967, p. 229) and which are systems of accounting that reflect mandates established by state statutes governing public schools.

New Jersey's Statutes Title 18 and 18A provide rules and regulations to which local school districts must conform when establishing and maintaining their bookkeeping systems and budgetary formats. The New Jersey Administrative Code, Subchapter Two, Bookkeeping and Accounting in Local School Districts provides another official source of information concerning these guidelines. Their implementation is spelled out with varying specificity in Financial Accounting for New Jersey School Districts, The Chart of Accounts and Directions for Using the New Jersey Public School Financial Accounting System.

The following classification[1] is suggested for use in budget and cost distribution records:

a. Administration
b. Instruction
c. Attendance and Health Services
d. Transportation
e. Operation of Plant

---

[1] This classification was adhered to in the work that was done in this study. Equipment (classified as capital outlay) purchased to improve existing programs, e.g., replace old equipment, was not classified as capital outlay in this study, but as an operating cost.

f. Maintenance of Plant
g. Fixed Charges
h. Sundry Accounts
    1. Food Services
    2. Student Body Activities
    3. Community Services
    4. Special Projects and Schools
i. Capital Outlay (land, buildings and equipment)
j. Debt Service (bonds, authorized notes and interest on same)
k. Evening Vocational Schools
l. Evening Schools for Foreign Born Residents (Oxfolk, p. 2)

It is evident that extracting the cost of any one program from a system of financial record keeping based on such a chart of account is a very difficult, if not impossible, task.

The N. J. State Department of Education, being aware of the deficiencies in the accounting system in use, initiated a Program Budgeting System in 1973 that is consistent with the concept of Planning, Programming, Budgeting System (PPBS). Currently there are 31 school districts participating in the pilot project designed to test the system as a replacement for the traditional accounting techniques in use for so many years. The PPRS system would allow "educational policy and program decisions [to] be based on a full understanding of the costs involved" (N.J. Advisory Council, December, 1973, p. 42).

There is at this time no uniform system of cost-accounting for educational programs in New Jersey. The small number of school districts participating in the pilot project mentioned above and the need for them to develop a viable program budgeting system as an initial step in implementing the PPBS concept will undoubtedly prevent early statewide assumption of the technique.

With the majority of school districts still adhering to the traditional accounting methods, which preclude program cost accounting, a method of data collection that is compatible with both systems and from which one can compute per pupil cost of vocational education per program per school is in order.

ASSUMPTIONS

The following assumptions were developed during this study:

All personnel, services and facilities in a school district, building, and program are equally available to all students in that district, building and program. Therefore, the costs for these may be divided equally among all students.

All expenditures are verifiable through receipts and vouchers issued for payment.

In the Program Budgeting and Program Accounting system and the traditional line item accounting system, there is no duplication of disbursements of expenditures.

The life expectancy of equipment varies from program to program and even within programs precluding a generalized depreciation formula based on manufacturers estimates of life expectancy of equipment.

Computing the depreciation of equipment on a straight line basis over years of use is no better or worse than depreciation based on life of equipment as suggested by manufacturers.

DELIMITATIONS

This study was delimited to:

Financial costs accounted for in the cost accounting documents examined in the school districts selected.

Expenditures for one Practical Nursing program offered by one comprehensive high school in the northern part of the state during the full school year 1973-1974 using the traditional administrative line item accounting system.

Expenditures for one Health Related Occupations program offered by one comprehensive high school in the southern part of the state being offered during the current year using Program Budgeting and Program Accounting.

Actual costs incurred in the operation of the programs which are assigned to the programs in the school accounting ledgers.

Capital costs were excluded from the program cost data. Therefore, the results of this study are operating costs. The results are not appropriate for planning new program capital expenditures.

The costs are not categorized into direct and indirect costs.

Fact finding.

LIMITATIONS

Limitations such as geographic boundaries, budget, facilities and personnel resources may impede any study. The following limitations seem appropriate to mention concerning this study.

1. Personnel involved in the six month duration of the project consisted of a director one tenth time and two doctoral interns full time.
2. There was a heavy reliance upon the business administrators for placement of budget line data.
3. An economic theorist outside vocational education was not on the advisory committee.
4. Originally the proposal plans were to collect data from three types of schools. Only one type of school was used for data collection.
5. The school district personnel had limited time to assist the investigators in collecting and interpreting the data.
6. The equipment depreciation formula in this study is not consistent with the New Jersey State guidelines.
7. Utility costs were not calculated to a high degree of accuracy (see Appendix G on Cost of Utilities-Electricity).
8. The investigators used readily available data from the school districts.
9. The program costs were collected for one school year rather than the time duration of a program.

10. No consideration was given to the source of funds, i.e., Federal, State or local.

DEFINITION OF TERMS

The definition of terms is located in Appendix A.

REVIEW OF LITERATURE AND ANNOTATED BIBLIOGRAPHY

The investigators found in their initial investigation of literature on determining per pupil cost for programs that no systematic review was available. The decision was made to identify important research, divide these research documents and produce a review of literature in two parts plus annotated bibliographies. The reviews of literature are in Appendices D and E.

ADVISORY COMMITTEE

An advisory committee was designed to provide the project staff maximum, unbiased input. To achieve the maximum breadth of input members were selected from the levels of State Department personnel to vocational teachers. Specific criteria were established for selection of members to avoid bias input or, at least, to achieve varying analyses and factual data to minimize bias.

The levels of personnel in the advisory committee were:

Director, Vocational Management Services
Director, Data Collection and Evaluation
Supervising Consultant Post Secondary Education
County Career Education Coordinator
Superintendent, County Vocational System
Business Manager, County Vocational System
Principal, Vocational School
Teacher

The criteria for selection of the advisory committee included:

1. All levels of vocational education administration and personnel should be represented.

2. Members were selected at the county level in which pilot data for the project was not to be collected.

3. The members were directly involved in obtaining and analyzing data in their position.

4. Recommendations had been obtained to verify the expertise of each member.

Based upon the above rationale the advisory committee members were:

Mr. John Amato
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(609) 767-7000

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Mr. Joseph W. English, Director
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Sewell, N.J. 08080
(609) 468-1445

Mrs. Ruth Gold
Teacher of Beauty Culture
Somerset County AVTS
North Bridge & 9th Streets
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(609) 292-0009

Two advisory committee meetings were held. The minutes of these meetings are in Appendix B. Responses of some members are given in Appendix C.

PUBLICITY

The project staff contacted the superintendents of county vocational systems, the career education county coordinators and county superintendents of schools. The purpose was to obtain cooperation of these persons. Feedback in conversations with these groups yielded the following ideas:

Use comprehensive high schools.

Include special needs centers.

Possibly include the study of day school or night school.

What is the cost for thorough and efficient education?

What is the cost of transportation (bus/car/train cost)?

What is the cost in terms of loss of student time, e.g., bussing?

Cost might be calculated for vocational education, related subjects, introduction to vocations, T4C, etc.

What about quality vs. quantity?

What is the optimum class size, facility size, etc.?

What is the difference between academic and vocational education costs?

What formulas for depreciation exist?

The retrieval of data may be difficult unless a computer is used.

In determining costs consider general educational costs, operating cost, overhead costs, ancillary costs.

Costs for shared time vocational school must include the costs of the sending school.

Commissioner's report on cost of vocational education.

Review Shoemaker's rebuttal to the GAO report.

Do not identify districts in report.

Restrict to grades 9-12; do not do introduction to vocations Technology for Children, Industrial Arts, or MDTA.

State accounting is by purpose not by program.

Federally funded programs should be checked.

Present accounting procedures are not accurate.

Refer to House Bill A 18-22. This refers to accounting system developed for occupational programs in community colleges.

Examine PL 93-38, HR 69- Consolidation Act.

Comparison and evaluation should be done by administrators.

The Department of Higher Education - Community College Program has a three year study available in March, 1975.

What is the salvage value of buildings?

Federal funding provides less than 3% of the funding for vocational education.

Definition of terms must be standardized.

SELECTION OF THE SAMPLE

The proposal for this study included the intent to collect data from, at least, three types of schools and three types of occupational programs. These plans were too ambitious. The final results were data collection in two counties, two schools (one in each county) and one program in each school. The criteria for selection of counties and programs and the results of the selection process follow.

CRITERIA FOR COUNTY SELECTION

The counties selected for use in the study were determined by the following factors:

a. Proximity to investigators (to reduce project costs).

b. Rural, urban, and suburban representation.

c. Contain all types of schools used in the study.

d. Location representative of the State (north, central, south).

e. Local administrative interest in the project.

f. Typical of districts throughout the state.

g. Willingness of county educators to cooperate.

Two primary counties were chosen to represent the state along with two alternate counties. The pilot study was then field tested within the two primary counties. The primary counties were representative of the state and were located in the northern half and the southern half of the state.

The northern section of the state was represented by the following counties: Bergen, Essex, Hunterdon, Hudson, Mercer, Middlesex, Monmouth, Morris, Passaic, Somerset, Sussex, Union and Warren.

Counties representing the southern half of the state include the following: Atlantic, Burlington, Camden, Cape May, Cumberland, Gloucester, Ocean and Salem.

Through an initial process of interviewing, and examination of programs, and demographic characteristics, the selection of primary counties was limited to Camden and Hunterdon counties. (See Figure 1.)

CRITERIA FOR SELECTION OF VOCATIONAL PROGRAMS

A review of the Directory of New Jersey Area Vocational Technical Schools, 1972-1973, revealed that several programs were offered in most of the schools throughout the state. The programs selected met the following criteria:

1. The programs are representative of those offered throughout the state. Out of a total of 21 counties, auto body repair in offered in 16, auto mechanics and beauty culture in 20. Drafting and design and practical nursing programs are offered in 18 of the 21 counties.
2. The programs are offered in various types of vocational schools, i.e., area county vocational schools, comprehensive high schools, and shared time centers.
3. Each program conforms to the definition of vocational education.
4. The programs are offered at one site location to facilitate data collection.
5. The programs are well established within the vocational education framework.
6. The programs represent those using durable and expendable materials as well as large and small tools/equipment that tend to be unique to those programs.
7. Course duration varies from one to two years.
8. School facilities, equipment, tend to be used exclusively by students in the programs.

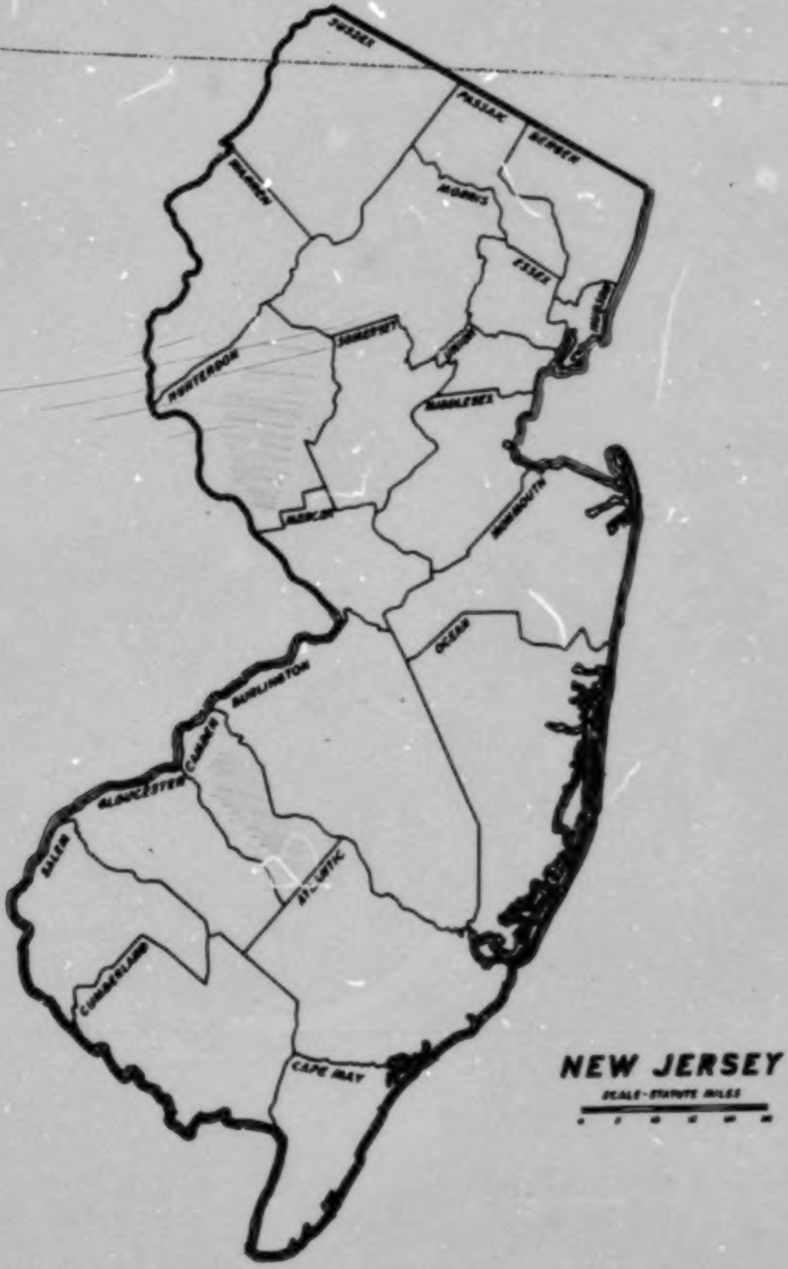
SUSSEX
PASSAIC
BERGEN
WARREN
MORRIS
ESSEX
HUDSON
UNION
SOMERSET
HUNTERDON
MIDDLESEX
MERCER
MONMOUTH
OCEAN
BURLINGTON
CAMDEN
GLOUCESTER
SALEM
ATLANTIC
CUMBERLAND
CAPE MAY
NEW JERSEY
SCALE-STATUTE MILES

FIGURE 1

The above criteria were established to facilitate data collection for the development of the cost model, yet contain sufficient diversity to test the generalizability of the model to all vocational programs in the state.

The programs selected were one Practical Nursing program offered by a comprehensive high school and one Health Related Occupations program offered by a comprehensive high school.

METHODOLOGY

The investigators of this study consisted of three persons. The project director worked 1/10 time and two doctoral students completing their doctoral internships worked full time. The duration of the study was six months, January 1, 1975 to June 30, 1975. The steps followed by this team are shown in a flow chart in Appendix F. The only task not completed was event number 15 "Determining Thorough and Efficient Components." This task will have to be accomplished at a later time. It should be noted that cost data without the "thorough and efficient" or some quality measure are not too meaningful.

Beginning at task 22 "Secure permission to collect data," a more detailed explanation is needed.

22. Secure permission to collect data.

    a. The research team contacted the Business Manager of each school selected and arranged for an orientation meeting.

    b. Plans for data collection were presented.

    c. Permission to collect data was granted.

    d. Visitation dates were arranged.

25. Pilot Data Completed. The team then visited each school selected to gather the following data:

    a. Program Level Expenditures: Determine and classify all those expenditures relating equally to all those students enrolled in the program and verify costs and classification of the costs with the Business Manager.

b. Vocational Building Level Expenditures: Determine and classify all those expenditures relating equally to all the students in vocational education and verify the costs with the Business Manager.

c. Building Level Expenditures: Determine and classify all those expenditures relating equally to all the students in the high school building and verify the costs with the Business Manager.

d. District Level Expenditures: Determine and classify all expenditures relating equally to all the students in the school district and verify the costs with the Business Manager.

e. Average Daily Attendance - Information obtained from the school Registrar and/or the Business Manager as entered in the official student register.

f. Average Daily Enrollment - Information entered in the official student register obtained from the school Registrar and/or Business Manager.

g. Number of Vocational Teachers - Obtained from the vocational school administrator and/or Business Manager and collected for further refinement of cost data but not used in this pilot study.

h. Total Square Feet of Area Used in Vocational Education - Information obtained from the school administrator, Business Manager and/or scaled drawings of the plant to be used for determining cost of lighting and heat but not computed in this pilot project.

i. Number of Students in the Program Being Investigated - Information obtained from the school Principal, Vocational Director or Business Manager.

j. Class Hours Per Week, Number of Weeks, and Number of School Days in the Year Under Consideration - Information obtained from the school Principal, Vocational Director or Business Manager.

k. Equipment Cost - Information obtained from records of equipment purchased available through the office of the Business Manager, school Principal or Vocational school Director. Cost per year obtained by dividing original cost of equipment by number of years of usage. See Appendix H and I.

26. Data analysis to determine:[1]

    a. District Level Per Pupil Cost:

        1. Sum all district level expenditures for the year under consideration.

        2. Divide by number of students in district according to

            a. Average daily enrollment and

            b. Average daily attendance

    b. Building Level Per Pupil Cost

        1. Sum all building level expenditures for the year under consideration.

        2. Divide by the number of students in the building according to:

            a. Average daily enrollment and

            b. Average daily attendance

    c. Vocational Building Level Per Pupil Cost:

        1. Sum all vocational building level expenditures for the year under consideration.

        2. Divide by the number of students in vocational education according to:

            a. Average daily enrollment and

            b. Average daily attendance

---

[1] The reader can examine Appendices H or I to see actual costs used for the data analysis.

d. Program Level Per Pupil Cost:

   1. Sum all program expenditures for the year under consideration.

   2. Divide by the number of students in the vocational program according to:

      a. Average daily enrollment and

      b. Average daily attendance

e. Total Per Pupil Cost:

   1. Sum each level of per pupil cost as obtained above.

f. Total Program Cost:

   1. Multiply total per pupil cost by the number of students in the program according to:

      a. Average daily enrollment and

      b. Average daily attendance

g. Percent of Total Per Pupil Cost for Each Level:

   1. Divide each level per pupil cost by total per pupil cost.

STUDY FINDINGS

The cost data for the Health Occupations Program* using the ADE as a base is in Table 1. The district per pupil cost for the Health Related Program is $295.11. The building level per pupil costs is $384.22. The vocational building level per pupil cost is $143.24. The program level per pupil cost is $834.68, and the total per pupil cost is $1,657.25. Total program cost is $39,774.00. Table 1 shows that the district per pupil cost is 18% of the total per pupil cost. The building level per pupil cost is 23%. The vocational building level per pupil cost is 9% of the total per pupil costs and the program level per pupil cost is 50%.

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*Refer to Appendix H for complete analysis of Health Occupations cost data.

TABLE 1 *

AVERAGE DAILY ENROLLMENT BASE
HEALTH OCCUPATIONS PROGRAM

Category	Amount	Percent
District Per Pupil Costs	$295.11	18
Building Level Per Pupil Costs	384.22	23
Vocational Building Level Per Pupil Costs	143.24	9
Program Level Per Pupil Costs	834.68	50
Total Per Pupil Costs	$1,657.25	100
Total Program Cost for 24 Students	$39,774.00	

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* These costs are for a one year period only and are not the total costs for the occupation program, i.e., two years. Review the ninth limitation on page six. This limitation applies to all cost data in this report.

Table 2 contains the cost data using the average daily attendance as a base. The district per pupil cost for the Health Related Program is $336.14. The building level per pupil cost is $439.33. The vocational building level per pupil cost is $167.88. The program level per pupil cost is $910.56, and the total per pupil cost is $1,853.91. Total program cost is $40,736.02. Table 2 shows that the district per pupil cost is 18% of the total per pupil cost. The building level per pupil cost is 24%. The vocational building level per pupil cost is 9% of the total per pupil cost and the program level per pupil cost is 49%.

The cost data for the Practical Nursing Program* using ADE as a base is in Table 3. The district per pupil cost for the Practical Nursing Program is $795.10. The building level per pupil cost is $325.34. The vocational building level per pupil cost is $237.80. The program level per pupil cost is $890.21, and the total per pupil cost is $2,248.45. Total program cost is $38,223.65. Table 3 shows that the district per pupil cost is 35% of the total per pupil costs. The building level per pupil cost is 14%. The vocational building level per pupil cost is 11% of the total per pupil costs and the program level per pupil cost is 40%.

Table 4 contains the Practical Nursing Program cost data with ADA used as the base. The district per pupil cost for the Practical Nursing Program is $876.84. The building level per pupil cost is $358.77. The vocational building level per pupil cost is $262.21. The program level per pupil cost is $945.85, and the total per pupil cost is $2,443.67. Total program cost is $39,098.72. Table 3 shows that the district per pupil cost is 36% of the total per pupil cost. The building level per pupil cost is 14%. The vocational building level per pupil cost is 11% of the total per pupil cost and the program level per pupil cost is 39%.

CONCLUSIONS

After reviewing the literature, identifying cost variables, defining terms, collecting data and having the advisory committee critique the project results, the following conclusions were derived:

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*Refer to Appendix I for complete analysis of Practical Nursing Cost data.

TABLE 2

AVERAGE DAILY ATTENDANCE HEALTH OCCUPATIONS

Category	Amount	Percent
District Level Costs Per Pupil	$336.14	18
Building Level Per Pupil Costs	439.33	24
Vocational Building Level Per Pupil Costs	167.88	9
Program Level Per Pupil Costs	910.56	49
Total Per Pupil Costs	$1,853.91	100
Total Program Cost for 22 Students	$40,736.02*	

*Costs calculated for ADA are higher than those calculated using ADE, $39,774.00 vs. $40,786.02, a $1,012.02 difference.

TABLE 3

AVERAGE DAILY ENROLLMENT BASE PRACTICAL NURSING

Category	Amount	Percent
District Per Pupil Costs	$795.10	35
Building Level Per Pupil Costs	325.34	14
Vocational Building Level Per Pupil Costs	237.80	11
Program Level Per Pupil Costs	890.21	40
Total Per Pupil Costs	$2,248.45	100
Total Program Cost for 17 Students	$38,223.65	

TABLE 4

AVERAGE DAILY ATTENDANCE BASE
PRACTICAL NURSING

Category	Amount	Percent
District Per Pupil Costs	$876.84	36
Building Level Per Pupil Costs	358.77	14
Vocational Building Level Per Pupil Costs	262.21	11
Program Level Per Pupil Costs	945.85	39
Total Per Pupil Costs	$2,443.67	100
Total Program Cost for 16 Students	$39,098.72	

Program level cost per pupil constitute the greatest proportion of total per pupil cost when data is obtained from both program budget accounting system and the traditional administrative type accounting system.

Expenditures listed in program budget accounting system are more accessible than those listed in the traditional administrative accounting system.

Per pupil cost can be determined when available data is in the program budget and program accounting system and traditional administrative accounting system.

All levels of cost contributing to total cost per pupil are higher when ADA (Average Daily Attendance) is used as a base than when ADE (Average Daily Enrollment) is used. Using ADE gives more accurate costs.

Expenditures should be used rather than budget estimates for calculating per pupil cost.

RECOMMENDATIONS

Based upon the experience of the project investigators and the expressed needs of legislators, N. J. State Department of Education, local school districts and the public, the following recommendations concerning the continuation of this project are given:

Data should be collected in occupational programs on a state wide basis in those educational institutions in which the New Jersey State Department of Vocational Education has primary concern, e.g., AVTS, Comprehensive High Schools, and Community Colleges.

The second part of the cost analysis model should be developed, i.e., the benefits or thorough and efficient dimension suggested by the Advisory Committee and which is essential to interpret the meaning of per pupil cost.

A manual should be developed to enable local administrators to collect adequate and consistent cost-benefit data.

Consideration should be given to the funding of dissertations concerned with program costs.

Cost analysis studies utilizing square foot computation of utility consumption by individual programs should be initiated.

The program budget accounting system should be adopted if an efficient methodology for calculating the cost of vocational education by program and per pupil is to be achieved.

APPENDIX A

DEFINITION OF TERMS

DEFINITION OF TERMS

The following definition of terms are important to the understanding of the study and are taken mainly from the Financial Accounting - Classifications and Standard Terminology for Local and State School Systems. Handbook II, 1973.[1]

Account.--A descriptive heading under which are recorded financial transactions that are similar in terms of a given frame of reference, such as purpose, object, or source.

Accountability.--The capability and the responsibility to account for the expenditure of money and the commitment of other resources in terms of the results achieved. This involves both the stewardship of money and other resources and the evaluation of achievement in relation to specified goals.

Accounting.--The procedure of maintaining systematic records of events relating to persons, objects, or money and summarizing, analyzing, and interpreting the results of such records.

Accounting Period.--A period at the end of which and for which financial statements are prepared; for example, July 1 to June 30.

Accounting System.--The total mechanism of records and procedures of recording, retrieving, and reporting information on the financial position and operations of a governmental unit or any classifying of its funds, balanced account groups, and organizational components.

ADE.--Average daily enrollment sometimes referred to as average daily membership is the aggregate days membership (enrollment) divided by the number of school days in session.*

Administration.--Those activities which have as their purpose the general direction, execution, and control of the affairs of the LEA that are systemwide and not confined to one school, subject, or narrow phase of school activity.

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[1] Definitions obtained from other sources or derived by the writers of this report are identified by an asterisk.

Administrative Action.--Any action which results in the general regulation, direction, or control of the affairs of the organizational unit.

Average Daily Attendance, ADA.--The aggregate days attendance of a given school during a reporting period divided by the number of days school is in session during this period. Only days on which the pupils are under the guidance and direction of teachers should be considered as days in session. The average daily attendance for groups of schools having varying lengths of terms is the sum of the average daily attendances obtained for the individual schools.

Average Daily Membership, ADM.--The aggregate days membership of a school during a reporting period divided by the number of days school is in session during this period. Only days on which pupils are under the guidance and direction of teachers should be considered as days in session. The average daily membership for groups of schools having varying lengths of terms is the sum of the average daily memberships obtained for the individual schools.

Budget.--A plan of financial operation embodying an estimate of proposed expenditures for a given period or purpose and the proposed means of financing them. The budget usually consists of three parts. The first part contains a message from the budget-making authority together with a summary of the proposed expenditures and the means of financing them. The second part consists of schedules supporting the summary. The schedules show in detail the proposed expenditures and means of financing them together with information as to past years' actual revenues and expenditures and other data used in making the estimates. The third part is composed of drafts of the appropriation, revenue, and borrowing measures necessary to put the budget into effect.

Building Level Expenditures.--All financial outlays for operation and maintenance of the building, services, utilities, available to all pupils located within the building.*

Capital Outlay.--An expenditure which results in the acquisition of fixed assets or additions to fixed assets which are presumed to have benefits for more than one year. It is an expenditure for land or existing buildings, improvements of grounds, construction of buildings, additions to buildings, remodeling of buildings, or initial, additional, and replacement of equipment.

Chart of Accounts.--A list of all accounts generally used in an individual accounting system. In addition to account title, the chart includes an account number which has been assigned to each account. Accounts in the chart are arranged with accounts of a similar nature; for example, assets and liabilities.

Cost Accounting.--That method of accounting which provides for the assembling and recording of all the elements of cost incurred to accomplish a purpose, to carry on an activity or operation, or to complete a unit of work or a specific job.

Course.--A course is a part of a program in which a set of learning activities has been planned for learner participation. In some instances a series of courses may constitute a program.*

Current Expenditures Per Pupil.--Current expenditures for a particular period of time divided by a pupil unit of measure.

Depreciation.--Loss in value or service life of fixed assets because of wear and tear through use, elapse of time, inadequacy, or obsolescence.

Direct Costs.--Those elements of cost which can be easily, obviously, and conveniently identified with specific activities or programs, as distinguished from those costs incurred for several different activities or programs and whose elements are not readily identifiable with specific activities.

District Expenditures.--All financial outlays for administrative and support personnel, facilities, and services available to all pupils in the district.*

Encumbrances.--Purchase orders, contracts, and salary or other commitments which are chargeable to an appropriation and for which a part of the appropriation is reserved. They cease to be encumbrances when paid or when actual liability is set up.

Equipment.--Any instrument, machine, apparatus, or set of articles which (a) retains its original shape and appearance with use and (b) is nonexpendable; i.e., if the article is damaged or some of its parts are lost or worn out, it is usually more feasible to repair it than to replace it with an entirely new unit. [That which is priced at $100 or more.*]

Expenditures.--Charges incurred, whether paid or unpaid which are presumed to benefit the current fiscal year.

Fixed Assets.--Land, buildings, machinery, furniture, and other equipment which the LEA intends to hold or continue in use over a long period of time. "Fixed" denotes probability or intent to continue use or possession, and does not indicate immobility of an asset.

Health Occupations.--A one year program in the 12th grade. Prepares students to function as nurses' aids in hospitals and other health care agencies. Program involves classroom study three mornings a week (three 44 minute periods) and hospital experience two morning a week (same time limitation as above).

Indirect Expenses.--Those elements of cost necessary in the provision of a service which are of such nature that they cannot be readily or accurately identified with the specific service. For example, the custodial staff may clean corridors in a school building which is used jointly by administrative, instructional, maintenance, and attendance personnel. In this case, a part of custodial salaries is an indirect expense of each service using the corridors. However, it is impossible to determine readily or accurately the amount of the salary to charge each of these services.

Indirect Services.--Services for programs which cannot be identified with a specific program. All support services programs are indirect services of instruction programs.

Instruction.--Instruction includes the activities dealing directly with the teaching of pupils. Teaching may be provided for pupils in a school classroom, in another location such as in a home or hospital, and other learning situations such as those involving cocurricular activities; it may also be provided through some other approved medium such as television, radio, telephone, and correspondence.

Instructional Personnel.--Those who render direct and personal services which are in the nature of teaching. Included here are: teachers (including teachers of homebound), teaching assistants, teacher aides, secretaries for teachers, special graders, substitute teachers, and clerks serving teachers only. Attendance personnel, health personnel, and other clerical personnel should not be included as instructional personnel.

Ledger.--Contains all the accounts of a particular fund or all those detail accounts which support a particular General Ledger account.

Local Education Agency.--An educational agency at the local level which exists primarily to operate schools or to contract for educational services. Normally, taxes may be levied by such publicly operated agencies for school purposes. These agencies may or may not be coterminous with county, city, or town boundaries. This term is used synonymously with the terms "school district," "school system," and "local basic administrative unit."

Object Classification.--A category of goods or services purchased.

Object.--The commodity or service obtained from a specific expenditure.

Overhead Costs.--Those elements of cost necessary in the production of an article or the performance of a service which are of such a nature that the amount applicable to the product or service cannot be determined accurately or readily. Usually they relate to those objects of expenditures which do not become an integral part of the finished product or service, such as rent, heat, light, supplies, management, supervision, and other similar items.

Planning-Programming-Budgeting Evaluation System (PPBES).--A structured procedure for determining policy in the allocation of resources for accomplishment of priority programs; it emphasized long-range planning, analytic evaluative tools, and economic rationality in setting goals and objectives and in the determination of programs.

Practical Nursing.--A two year program. The first year is offered in the 12th grade of high school. The second year is post graduate or the 13th year. Only the first year of study was considered in this pilot project. Students in the program spend four mornings a week in class and one morning a week in the local hospital. The program prepares pupils to sit for licensure examination for practical nursing. Once licensed the graduate may be employed as a Licensed Practical Nurse in any hospital or health care facility and function under the supervision of a Registered Professional Nurse and/or Licensed Physician as mandated by the Nurse Practice Act of New Jersey.*

Program.--Refers to an integrated activity or set of activities, including the combination of personnel, equipment, facilities, finances, etc. which together constitute an identifiable means to some objective of the educational system (Kraft, 1969, pp. 35-36).*

Program Budgeting and Program Accounting.--Is limited to budgeting and accounting systems emphasizing categorization schemes by programs (Kraft, 1969, p. 36).*

Program Expenditures.--All financial outlays for salaries of teaching personnel, teaching materials and supplies and equipment available to all pupils in the program.*

Prorating.--The allocation of parts of a single expenditure to two or more different accounts. The allocation is made in proportion to the benefits which the expenditure provides for the respective purposes or programs for which the accounts were established.

Pupil Accounting.--A system for collecting, computing, and reporting information about pupils.

Regular Salaries.--Full-time, part-time, and prorated portions of the gross salary costs for work performed by employees of the LEA who are considered to be in positions of a permanent nature.

Supplies.--That which was priced at less than $100.00 was classified as supplies. Supplies were depreciated in one year.*

Vocational Building Level Expenditures.--All financial outlays for supervisory services, utilities, etc. available to all pupils located within the building.*

APPENDIX B

ADVISORY COMMITTEE MEETING MINUTES
MARCH 13, 1975
AND
JUNE 19, 1975

RUTGERS UNIVERSITY *The State University of New Jersey*

GRADUATE SCHOOL OF EDUCATION
Department of Vocational-Technical Education
New Brunswick, New Jersey 08903
Tel. 201–247-7636, 932-7937

March 20, 1975

Thank you for attending the advisory committee meeting. We know you had a long day.

We have restructured some of our plans based on your input. It was a very comfortable and productive session.

The project staff has summarized the following as being those items which the advisory committee was in agreement:

1. Develop a conversion system to provide the link between the existing accounting system (in most school districts) and the PPBS system.

2. Use the U. S. Office of Education Financial Accounting Classifications and Standard Terminology for Local and State Accounting Systems. Handbook II, 1973.

3. Use Internal Revenue Service Schedule E for estimating depreciation and salvage rates on equipment, buildings and tools. (Tools costing under $100 are written off in one year. Tools are actually labeled supplies.)

4. Rate of inflation might be calculated by insurance company indeces. (Advisory committee members are asked to supply references for this use, i.e., insurance and other sources.)

5. Model for calculating costs must include description of characteristics of school and occupational programs so cost may be accurately interpreted.

6. Optimum class size must be established for occupational programs for cost calculation. (Study by William McNeice is available for this.)

7. Go to utility companies to obtain estimates of cost of utilities on square foot basis, e.g., light, heat.

8. Occupational teachers must confirm the direct costs.

9. This is a pilot study to develop and test a model for calculating per pupil cost.

10. Restrict study from grades 9-12.

11. Avoid calculating costs such as student time in bussing being considered time loss and, therefore, cost of money for the student. (Note: cost of transportation would be included.)

12. This is a pilot study and is (probably) to be continued.

13. Specific assumptions and/or definitions must be made, e.g., definition of parameters of vocational programs. T4C and Introduction to Vocations are not now to be considered in this study.

14. "Thorough and Efficient" factors should be incorporated into the model even though data would not be collected at present.

    Interesting comment: 31% of students receive vocational education in AVTS. 69% receive vocational education in comprehensive high schools.

15. In determination of cost per square foot, use of building, shared or full time, must be considered. For example, some schools may not have food facilities, gymnasiums, etc.

16. Industrial representative should be on the advisory committee.

17. This study will not enable a person to tell the difference in cost between an academic program and an occupational program. Occupational program costs are only being considered.

18. The project staff should go into schools as a team.

19. Formulas for training programs in industry should be examined.

Please critique this. Feedback from you is welcome and essential.

Sincerely,

Charles R. Doty
Project Director

Albert Gasior
Research Assistant

Rose Kocinski
Research Assistant

CRD/ns

Advisory Committee Meeting
June 19, 1975

On June 19, 1975 a meeting of the advisory committee was held for the purpose of critiquing the results of the project. Two advisory members were unable to attend due to illness. In addition to the committee Harold R. Seltzer, Associate State Director, N. J. State Department of Vocational Education attended the meeting.

A draft of the primary components of the final report was issued to each member. Three components were: 1) introduction, 2) definition of terms, 3) data analysis, 4) conclusions and 5) recommendations. The members read each component and critiqued the content. Their comments follow:

Introduction

1. The concept of "thorough and efficient" should be added to the introduction.

2. Cost per pupil should be calculated for all disciplines in education, not just vocational education.

3. Introduction should have emphasis on Federal and state funds--not just Federal funds.

4. Information in this study will be used by the State Department of Education for decision making.

5. The data in this study are operating costs and should not be used--or used with caution--for estimating costs of establishing new programs. The data in the study does not contain capital expenditures.

Definitions

Many terms were missing. The following must be included:

District Per Pupil Cost
Building Level Per Pupil Cost
Vocational Building Level Per Pupil Cost
Program Level Per Pupil Cost
Program
Course
Health Occupations
Practical Nursing
PPBS (Program Budgeting and Program Accounting)

Data Analysis

Utility costs can be calculated more accurately if there is any need but the cost of collecting exact data may be too high.

The State of N. J. has school districts classify equipment into two classes: 1) five year and 2) two year, for depreciation purposes. Mr. Musselman has specific information on this. The model developed for this project does not use these classifications.

The model was developed to collect data from any accounting system.

Capital costs were not calculated as part of the per pupil cost. This is fine because these costs would grossly distort the per pupil cost.

Conclusions

No comments.

Recommendations

No comments.

Additional Comments

Dr. J. Kelly, N. J. Department of Education, has definition of program.

Avoid the term comprehensive high school because the schools being discussed are actually area vocational comprehensive high schools.

Area vocational schools must be included in the next phase of the study.

APPENDIX C

COMMITTEE MEMBER RESPONSE TO MINUTES OF MEETING HELD MARCH 13, 1975

State of New Jersey
DEPARTMENT OF EDUCATION
DIVISION OF VOCATIONAL EDUCATION
225 WEST STATE STREET
TRENTON, NEW JERSEY 08625

March 25, 1975

Mr. Charles R. Doty, Project Director
Rutgers University
Graduate School of Education
Department of Vocational-Technical
  Education
New Brunswick, New Jersey   08903

Dear Mr. Doty:

I have read with great interest the summarization prepared by your project staff. I think that the summary is quite comprehensive, but I would like to comment on item number eight. In my opinion, the Board Secretary, Business Administrator, or Program Monitor should develop and confirm the direct costs since most occupational teachers are not that familiar with all the cost related details.

I would also suggest that if possible the study should include Post Secondary (item number ten). There has been a great deal of publicity and controversy recently between Post Secondary verses Vocational Education in the County Vocational Schools.

This pilot study is extremely worthwhile and will not be completed within the present time frame. There are many factors to be considered, however, it is the first step toward achieving the goal of cost program analysis which is definitely the trend of the future.

Sincerely,

W B Musselman

William B. Musselman, Director
Bureau of Vocational Management Services
Division of Vocational Education

WBM/lf

State of New Jersey
DEPARTMENT OF EDUCATION
225 WEST STATE STREET
P O BOX 2019
TRENTON, NEW JERSEY 08625

April 2, 1975

Professor Charles R. Doty
Department of Vocational/Technical Education
Graduate School of Education
Rutgers University
New Brunswick, New Jersey 08903

Dear Dr. Doty:

Thank you for your letter of March 20, 1975. I am most pleased and interested in reading the summarized suggestions made by the Advisory Committee.

After reading all the items suggested by the Advisory Committee, it becomes my concern that it might be too much for you and your assistant researchers to do during the first phase of research. Wouldn't it be advisable to ignore, for the moment, such items as Nos. 1,3,7,8, and 19 and strive for concrete cost figures on a limited basis (in regard to schools and programs) even at the expense of high precision? The whole idea can then be refined and expanded during the second phase, if the project is to be continued.

Needless to say, I fully trust that under your able directorship, the study will be successfully completed.

Sincerely yours,

Poyen Koo

Po-yen Koo, Ed. D.
Director, Vocational Data Collection
and Evaluation
Division of Vocational Education

PK/kw/W5

APPENDIX D

REVIEW OF LITERATURE

ALBERT G. GASIOR

REVIEW OF THE LITERATURE

Today, there is a definite lack of research studies concerning vocational education program cost information that is needed by educators to determine the cost per pupil, per program, per type of school. Such studies as those cited in this review of literature were designed to study variables in the following basic areas:

1. Cost analysis of secondary school vocational technical education programs.
2. Financial support for vocational education in the public schools.
3. Benefit - cost comparison of vocational education programs.
4. Systems for predicting costs of vocational education in community colleges.
5. An analysis of vocational program costs.

The general purposes of this review of literature are to: (1) show the relationship of the research topic to previously completed research, and (2) determine which methods and tools could be used in the investigation.

COST VARIABLES

The study by Harris, et al. (1973) of cost analysis of Secondary School Vocational Technical Education Programs, and Aldrich's (1972) analysis of vocational program costs are somewhat related to this study. Harris (1973) stated the purpose of his study as follows:

> . . . to conduct a microanalysis of costs of vocational technical programs in selected high schools in the State of Tennessee. Specifically, the purpose was to analyze a sample of present courses in vocational technical education programs and to determine what the per pupil contact hour cost was for vocational technical programs in the state (p. 2).

To determine the cost of educating a student in a specified vocational program, the calculation of current unit cost per student contact hour for each program was accomplished by Harris through the following steps:

1. A representative sample was selected from the population.
2. The selected sample of schools with vocational technical education programs in Tennessee was contacted and permission granted to collect the data necessary for completion of the study.
3. Each selected school was visited to gather the following data:
    a. Name, position and salary of each professional staff member associated with the vocational technical program.
    b. A class schedule for the current school year amended to provide the name and numbers of each section taught, credit and contact hour for each course, enrollment, and name of instructor.
    c. A copy of the master schedule describing each course and curriculum offered.
    d. A copy of the financial report for the fiscal period covered with all expenditures for current operations allocated to academic departments in so far as the records were available.
    e. The number of full-time equivalent students enrolled in each curriculum for the period covered.
4. Analysis of the data was made to determine:
    a. Direct costs per student contact hour for each course.
    b. Indirect costs per student contact hour for each course without consideration of the value of site or location.
    c. Indirect costs per student contact hour for each course with consideration of the value of the site and location.

d. Total cost per student contact hour for each course.

e. Total cost of educating a student in each course offered.

f. Projections of course and program costs in terms of existing and maximum enrollments for a five year period based on an inflationary change factor of five percent.

After the sample population was selected, an instrument was developed to be utilized in the collection of needed data. The instrument used was an adaptation of classifications of expenditure accounts from the handbook of the procedures for Financial Accounting for Local and State School Systems, Handbook II.

Aldrich (1972) in his research utilized an analysis of vocational program costs and made the following statement regarding his problem:

> The purpose of this study is to determine vocational program costs at both the secondary and post secondary levels for categorical fund support. That purpose necessitated the accomplishment of three objectives. First, current costs of vocational programs had to be identified. That objective required the development of a program accounting procedure that, in turn, entailed identifying:
>
> 1. A chart of accounts.
>
> 2. Procedures for prorating indirect costs.
>
> Second, once costs of programs were determined, appropriate program unit costs could be established serving as a basis for meaningful cost comparisons. Development of such a basis was the second objective. Finally, a formula was created and tested, utilizing unit cost determined from the above, to estimate and control for purposes of allocation, the cost of vocational programs - the third objective.

Aldrich explained that critical areas of concern in studies that were designed to determine and estimate the cost of vocational programs are:

1. Budget chart of accounts.

2. Proration of indirect cost.

3. Base unit of measure.
4. Development of cost estimation formula.

The budget chart of accounts developed in this study were adaptions of various aspects of PPBS (Program Planning Budgeting System).

In support of use of the PPBS, Pierce (1972) stated the following:

> One tool which I expect to see adapted more and more frequently is the program, planning and budgeting system, which provides a strategy for decision makers to utilize scarce financial resources in the most efficient manner possible.

Sorenson (1972) also supported the use of PPBS, he explains:

> The continued use of PPBS undoubtedly will alleviate the problem of identifying vocational education program costs.

The review of literature by the writer showed that cost variables were not consistent in the studies reviewed. Each researcher developed his own system depending upon the objectives of the study. It can be summarized that there are limited avenues available for data collection, mainly because the accounting systems do not provide data for such assessment.

INDIRECT COSTS

Harris (1973) stated that the instruments used in his study were adaptations of classifications of expenditure accounts from the handbook of the procedures for Financial Accounting for Local and State School Systems Handbook II (1957).

Aldrich (1972) stated that the budget chart of accounts developed in his study was adapted from various aspects of PPBS. Sanders (1971) found that varying amounts of operating costs were reported by administrators of the schools visited. Sorenson (1972) wrote that the continued use of PPBS undoubtedly will alleviate the problem of identifying vocational education program costs. Harris (1972) reported that costs in his study were based upon vocational education costs which were generated by a study conducted for the Florida Division of Vocational Technical Education.

According to Aldrich (1972) the proration of indirect costs is a critical area of concern in studies that determine and estimate the cost of vocational programs. An examination of the literature by Aldrich indicated that there were several approaches.

Aldrich stated that guidelines suggested by Badger (1945) and the USOE indicate the need for utilizing more than one proration method. In allocation of indirect costs, the following should be considered:

1. Student enrollment.
2. Student contact hour of instruction.
3. Student credit hour of instruction.
4. Square footage factor (Prorate cost of plant operation and maintenance).

Badger (1945) suggests five bases for allocating charges.

1. Direct charges.
2. Time.
3. Floor space.
4. Average daily attendance.
5. Actual number of persons served.

Heinkel and Klimpe (1970) have developed a proration formula for determining unit cost. It involves the following three items:

1. Some expenditures are prorated directly to the course.
2. Most often expenditures were prorated to each class section.
3. Some costs were prorated to student enrollment and then were multiplied by the number of students in each section.

In his study, Aldrich (1972) reports on the proration of indirect cost for the following studies by Anderson, Cage, Perry and Robertson:

Anderson (1966) indicated that services supportive to instruction were assigned on the basis of student credit hour of instruction. Supportive expenses that were not allocated to the instructional departments were distributed on the basis of the relationship of the direct salary cost of each department to the total direct salary cost of the instruction.

Cage (1969) prorated on the basis of full time equivalent enrollment the expenses incurred by administration salaries, operation, and maintenance of plant, and other indirect expenses.

Parry (1968) prorated indirect cost for administration, student personnel services, equipment maintenance, fixed charges, and auxiliary services on the basis of membership hours of instruction. Plant operation and maintenance costs were prorated on a combined basis of square footage and membership hour.

Robertson (1968) prorated the indirect general support cost by multiplying the number of student credit hours each course was worth per student times the general support cost per credit hour. The latter figure was obtained by dividing the total general support cost by the total instructional credit hours.

To summarize, most indirect costs were prorated using the following procedures:

1. Student enrollment.
2. Student contact hour of instruction.
3. Student credit hour of instruction.
4. Square footage factor to prorate indirect cost of plant operation and maintenance.

DIRECT COSTS

Aldrich (1972) reminds us that in order to determine the total costs of an instructional program, one must make a number of decisions regarding the structure of the budget expenditure accounts. One can see truth in this statement by looking at the different cost variables used in the following studies reviewed.

Harris (1972) included an analysis of the following expenditures of area vocational technical centers:

1. An amount allocated from expenditures for system wide administration.

2. An amount allocated from the expenditures made from the county-wide administration and supervision of vocational, technical and adult education.

3. An amount determined to have been expended for current operations for instruction in the vocational technical programs provided in the center including:

    a. Salaries for certified personnel.

    b. Salaries for non-certified personnel.

    c. Free textbooks.

    d. Library services.

    e. Instructional supplies.

    f. Other expenses for instructors.

    g. Contracted services for instruction.

4. An amount determined to have been expended for the operation of the physical plant of the area center, (or an amount allocated from district wide expenditures for plant operations).

5. An amount determined to have been expended for the maintenance of the physical plant of the area center (or an amount allocated from district-wide expenditures for plant maintenance).

6. An amount determined to have been expended for auxiliary services, including transportation.

7. An amount allocated for district-wide fixed charge expenditures.

8. Charges for depreciation of movable equipment calculated at one tenth of the original value of the equipment.

9. An amount expended for current operations of the center from its internal accounts (from non-tax sources).
10. Current operating and capital costs incurred either directly or indirectly by the public sector (federal, state and local governmental agencies) comprised the public costs of vocational education programs.
11. Indirect cost--the opportunity cost of foregone benefits which students could have realized if they had been employed in the labor market rather than attending vocational training.

Sorenson (1972) used the following:

1. Current cost of administration of vocational program.
2. Current cost of supervision of vocational program.
3. Current cost of vocational instructors salaries.
4. Current cost of classified staff salaries.
5. Current cost of instructional supplies.
6. Total current cost of vocational education programs.
7. Annual average daily attendance generated by students in the vocational program.
8. Annual current cost per average daily attendance in the vocational program.
9. Average weekly student contact hours per instructor in the vocational program.

Ittner (1972) listed his cost variables as direct and indirect and separated them into three categories. The cost variables for the institution, learner and community are listed as follows:

INSTITUTION

Direct Cost	Indirect Cost
Teachers Salaries	Administration
Supplies	Custodial
Equipment	Maintenance
Class Space	Counseling
Lab Space	Depreciation
Lab Assistant	A. Building
Tool Room Keeper	B. Storage
Instructional Materials	C. Equipment
Fringe Benefits	
Leasing	

LEARNER

Direct Cost	Indirect Cost
Books	Study Time
Tools	Failure-repeat time
Materials	
Lost Wages	
Transportation	

COMMUNITY

Direct Cost	Indirect Cost
Taxes - School Overrides	Competition in Job Market
Bonds - School	Change in Welfare
	Change in costs of Penal Institutions

Lindman (1972) excluded consideration of the expenditures for capital outlay and debt service. He defines direct cost as expenditures that can be attributed directly to specific instructional programs, and indirect cost as those current costs that represent overhead, administrative, and other expenditures that must be prorated among several programs.

He explains that an examination of existing program structures indicated that besides the service of instruction and its supporting activities, schools were also providing services for food, health, and transportation as well as for student and general community activities. Lindman stated that because those services are non-instructional, they should not be prorated to the cost of an instructional program, but costed separately.

He further explained that objects such as the salaries of principals, of their secretarial and clerical staffs, and of other instructional staff (librarians, guidance, and psychological personnel), as well as costs for libraries and audiovisual materials are omitted on the basis of the fact that none of those accounts can be charged directly to a specific instructional service. Each account has to be either omitted from instructional charges or prorated on the basis of a precise proration variable.

Galloway (1972) listed direct cost as current and capital expenditures. He explained during visits to the schools, the research team held discussions with school superintendents or principals as well as members of the administrative staff concerned with the financial and counseling aspects of the vocational program. These discussions contributed to Galloway's understanding of the operation of vocational schools programs and proved to be important in interpreting the data which were provided by school officials. His cost variables included the following:

1. A detailed financial statement of expenditures incurred during the budgetary year 1970-71.

2. A statement of the value of the schools physical property (land, buildings, and improvements, and equipment), itemized and dated by year of acquisition.

3. The total number of pupils in the school, (number of vocational as well as academic pupils in the case of comprehensive schools). The number of trainees, and of graduates in each of the

vocational programs under study. The number of vocational instructors in each program and the total number of vocational and academic teachers in the school.

Sanders (1971) wrote that varying amounts of operating costs were reported by administrators of the schools visited. Typical examples include costs for administrative purposes:

1. Instruction (teacher salaries).
2. Evening school operation.
3. Instructional materials.
4. Inservice training.
5. Health services.
6. Maintenance.
7. Insurance costs.
8. Salaries for support personnel.
    a. Secretaries
    b. Custodians

Costs per year for the above services vary depending on the size of the school.

The Texas Research League (1973) listed the following cost variables:

1. Salaries of administration and support personnel.
    a. Superintendent
    b. Principal
    c. Librarians
    d. School Nurse
    e. Etc.
2. Transportation.

3. Retirement Costs.

4. Current Expenditures.

5. Capital Outlay and Interest.

6. Maintenance and Debt Service.

Peat (1971) explained that the cost data was classified by direct expenditures and indirect expenditures. Peat computed the unit cost of vocational education on the basis of number of graduates and total expenditures in 1969-1970. The largest percentage of total expenditures was incurred by:

1. Salaries - 48%.

2. Administrative Expenditures - 14.8%.

3. Building and Improvement - 5.7%.

4. Books and materials - 4.1%.

5. Maintenance - 3.7%.

6. Equipment and Furniture - 7.6%.

7. Overhead - 10.5%.

8. Miscellaneous - 4.8%.

Essentially, a straight line method was used by Peat to ascertain the capital expenditures on buildings and other equipment which could be allocated to 1969-70.

1. Concrete Constructed Schools - 30 years.

2. Wooden Constructed Schools - 10 years.

Data for 1969-70 in Peat's report pertains to actual expenditures, which in turn were divided into direct cost and indirect costs. Direct costs are defined as the costs which can be directly identified with a particular course, such as salaries, equipment, building, and maintenance. When expenditures could be identified for a specific program they were included as direct cost. Indirect costs are defined as expenses incurred on a particular program. When such data was available it had to be broken down by courses. Such indirect costs may include salaries and wages, purchase of equipment, building, maintenance, furniture and fixtures, administration, etc.

Overhead expenditure is defined by Peat as that which directly or indirectly can be attributed to either a program or a course. An example of such an expense would be the salaries and expenses of the Office of the Assistant Secretary of Vocational School Programs, plus a proportion of the expenditures of the Department of Education.

Costs of vocational education were segregated in Peat's study into several major objects of expenditure. These object classifications can respond to six elements of cost bearing the greatest significance within the Vocational Education Programs. Cost components of lesser significance or magnitude were grouped together as follows:

1. Salaries.
2. Books and materials.
3. Administration.
4. Maintenance.
5. Building and Improvements.
6. Equipment, furniture, and fixtures.
7. Others.

Osburn (1974a) stated that costs incurred by schools in providing vocational education consisted of current operating expenditures:

1. Administrative Costs.
2. Operation.
3. Maintenance Cost.

Various capital outlay expenditures associated with equipment and physical facilities were also included. Costs were then specified in terms of a full time student equivalent, which was 540 contact hours per student. The annual depreciation of plant and equipment was estimated by the straight-line method.

Osburn (1974b) noted that the costs were summarized into two categories: Current cost and equipment costs. Current costs of administrative, instructional, and operational and maintenance costs. Equipment costs consist of the annual depreciated value of the equipment outlays.

Using the full time equivalent (FTE) enrollment data as the standard unit of output for cost accounting purposes, the costs of each individual vocational program were summarized by Osburn as average annual current cost per FTE per vocational program, and annual average total costs per FTE per vocational program.

It appears to this writer that the cost variables are not consistent in the studies reviewed. Each researcher developed his own system depending upon the objectives of his study. The important factor emerging is that a systematic chart of accounts such as that used by Harris (1973) should be developed which will include all possible expenditures associated with cost variables. The instruments used by Harris were adaptations of classifications of expenditure accounts from the handbook of the procedures for Financial Accounting Classifications and Standard Terminology for Local and State School Systems, Handbook II, 1957. (Note: A 1973 edition of this handbook is now available.)

GATHERING DATA

Various methods used in gathering the data for the studies are as follows:

Lindman (1972) reported the collection of data for his study necessitated the development of data collection instruments. He explained that two man research teams were sent to each district to collect and record the necessary data:

1. Direct expenditures of vocational programs.
2. Total district expenditures.
3. Master class schedule for each school in the district.
4. Floor area of classroom used for instruction by different services and programs within the district.
5. The number of full-time equivalent teachers for services and programs in the district.

Galloway (1972) states the selection of schools and programs was made in conjunction with the Division of Vocational Education. The selection was aimed at providing a balance in geographical location, urban-rural location,

2. Current cost of supervision of vocational program.

In order to calculate the public cost of vocational education for a given student Sorenson believes two factors must be considered:

1. Quantity of time that a student spends in a given vocational education program. (Hours of attendance.)

2. The value or cost per unit of time of the services he received as measured in terms of dollars.

Ittner (1972) states standard school accounts may not reflect all the costs which should be assessed for programs. Examples are costs of buildings and equipment, as well as student lost wages while training. In collecting data for their cost/benefit model, they added building and equipment costs on depreciated bases.

size of community served, the number of years vocational programs have been in operation, type of school.

Harris (1972) showed that different geographical regions have varying price levels which directly affect the cost of given vocational education programs. His selection criteria for programs was:

1. Only programs offered in AVTS would be included.
2. A minimum of 15 full-time enrollment.
3. A mix of programs to include both males and females would be selected.
4. Programs must have served secondary and non-secondary students.
5. The maintenance of the physical plant of the area center be allocated from district-wide expenditures for plant maintenance.
6. An amount determined to have been expended for auxiliary services, including transportation.
7. An amount allocated from district-wide fixed charge expenditures.
8. Charges for depreciation of movable equipment calculated at one tenth of the original value of the equipment.
9. An amount expended for current operations of the center from its internal accounts (from non-tax sources).
10. Current operating and capital costs incurred either directly or indirectly by the public sector (federal, state and local governmental agencies) comprised the public costs of vocational education programs.
11. Indirect cost--the opportunity cost of foregone benefits which students could have realized if they had been employed in the labor market rather than attending vocational training.

Sorenson (1972) used the following criteria for data collection:

1. Current cost of administration of vocational program.

BIBLIOGRAPHY

Aldrich, D. G. *An Analysis of Vocational Program Costs*. ED 075 597. *Los Angeles: The University of* California, Graduate School of Education, 1972.

Purpose: The purpose of this study is to determine vocational program cost at both the secondary and postsecondary levels for categorical fund support.

Procedure: Study activities include the following:

1. Current cost of vocational programs had to be identified.
2. Identification of a chart of accounts, and procedures for prorating indirect cost.
3. Once cost of programs were determined, appropriate program unit costs were established, serving as the basis for meaningful cost comparisons.
4. A formula was created and tested, utilizing unit cost to estimate and control, for purposes of allocation, the cost of vocational programs.

Conclusions: Some of the study conclusions noted:

1. Appropriate proration of indirect cost for General Support and for Plant Operation and Maintenance is critical in determining the precise total cost of an instructional service.
2. The findings revealed the ineffectiveness of suggested vocational cost estimation formula. Potential failure of the formula was indicated by finding such great cost fluctuation within each vocational program.

Galloway, L. E., and Ghazalak, I. A. *The Role of Vocational Education in Improving Skills and Earning Capacity in the State of Ohio: A Cost-Benefit Study*. *ED 067 448. Athens: Ohio State University, College* of Business Administration, March, 1972.

Purpose: The purpose of this study was to evaluate vocational education at the senior high school level in terms of both private and social costs and returns.

Procedure: Study activities include the following:

1. Fourteen vocational programs were studied in eighteen high schools in the state.

2. Data on costs and or potential earnings were obtained to determine the return on investment by program by school.

Conclusions: Some of the study conclusions noted were:

1. Findings of the study indicate that all but one of the vocational programs studied result in benefits (increase in earnings) that exceed costs.

Harris, G. W., et al. Cost Analysis of Secondary School Vocational-Technical Education Programs. ED 080 897. Tennessee Research Coordinating Unit for Vocational Education. Knoxville: Tennessee University, Bureau of Educational Research and Service, June, 1973.

Purpose: The purpose of this study was to conduct an analysis of costs of vocational-technical programs in selected high schools in the State of Tennessee. Specifically, the main purpose was to analyze a sample of present courses in vocational-technical education programs and to determine what the per pupil contact hour cost was for vocational-technical programs in the State of Tennessee. Objectives of the project were:

1. To determine the per pupil contact hour cost for each vocational-technical program.

2. To compute the existing or current cost of a vocational-technical education program.

3. To provide long range costs for vocational-technical program courses and categories.

Procedure: Study activities include the following:

1. A representative sample was selected from the population.

2. Schools were contacted and permission granted to collect the necessary data for the study.

3. Selected schools were visited to gather data.

4. Analysis of the data was made.

Conclusions: Some of the study conclusions noted were:

1. Costs of programs are increased or reduced by the number of high and low cost courses contained in each.
2. Indirect costs were found to represent a major category of costs in all program categories and courses.
3. Extension of this study to include all or more schools with secondary vocational-technical programs would make for more accurate and usable data.

Harris, M. A. Benefit-Cost Comparison of Vocational Education Programs. ED 074 223. Tallahassee: Florida State University, 1972.

Purpose: The purpose of this study includes the following:

1. To develop a methodology for conducting a benefit-cost analysis of vocational education programs in Florida.
2. To examine, compare, and analyze public and private costs, and benefits of four Florida vocational programs.
3. To compare public and private benefits and costs for students enrolled in day high school with students not enrolled in day high school.
4. To determine formulas which could be used in the development of a model for predicting public and private economic returns of vocational education programs.

Procedure: Study activities include the following:

1. Current program cost data were incorporated with data collected by means of student follow-up questionnaires.
2. Methodologies for determining benefits and costs of vocational education programs were developed.

3. Benefit and cost data were collected and analyzed.

4. Using statistical techniques of simple correlation, analysis of variance, chi square, and multiple regression, separate analysis of benefits, costs, benefit-cost ratios, and the relationship between costs and benefits were performed.

Conclusions: Some of the study conclusions noted:

1. The benefit-cost profiles which were constructed indicated that rates of return from investment in each of the four selected vocational education programs were positive and significant.

2. On the average, student cost of vocational education are greater than public costs.

3. The methodology which was developed in this study proved effective in conducting a benefit-cost study of vocational education programs in Florida.

Ittner, F. E. Project to Develop a Cost Benefit Model for Vocational Programs at College of Alameda. Final Report. ED 072 774. Los Angeles: Alameda College, University of California, August, 1972.

Purpose: This pilot study in the development of a cost/benefit model for vocational education programs in community colleges and its application to these programs at the College of Alameda will provide the basis for continued studies in the development of measurable outcome objectives which can relate cost of occuaptional programs to measurable outcome benefits.

Procedure: Study activities include the following:

1. The model includes a section of costs to be assessed and analyzed in terms of program costs and benefits to be derived.

2. Institutional direct and indirect costs were selected for analysis.

3. Benefits used were increased earnings to the student who completed the program and was placed in the field for which he was trained.

Conclusions: Some of the study conclusions noted:

1. Further follow-up studies should be conducted to determine the extent of salary increases, and students and faculty should be better informed of the starting salaries for various fields.

Lindman, E. L. Financial Support for Vocational Education in the Public Schools. Final Report. ED 069 927. Los Angeles: University of California, Graduate School of Education, September, 1972.

Purpose: The intent of this study is to determine vocational program costs at both the high school and the community college levels primarily for the purpose of administering categorical fund support.

Procedure: Study activities include the following:

1. Current costs of vocational education were identified, which required the development of a program accounting procedure that included:
   (a) chart of accounts
   (b) procedure for prorating indirect cost

2. After the costs of programs were determined, appropriate program unit costs could be established to serve as a basis for meaningful cost comparisons.

3. A formula was created and tested, utilizing unit costs determined from the above to estimate and control, for purposes of allocation, the cost of vocational programs.

Conclusions: Some of the study conclusions noted:

1. Specific guidelines should be established for prorating indirect costs among instructional programs.

2. State education agencies should establish standards for acquiring, maintaining, and replacing instructional equipment.

3. National goals for Vocational Education should be established with sufficient precision so that the cost of attaining them can be estimated.

Osburn, D. D., and Frank, H. "An Analysis of Factors Influencing Costs Among Area Vocational Schools," Journal of Industrial Teacher Education, Volume III, Number 4, 1974.

Purpose: The purpose of this study was to determine the relationship between size of area vocational technical schools and expenditures per student in the state of Missouri.

Procedure: Study activities include the following:

1. Cost data collected were relevant only to the regular day classes offered to full-time high school day students on the secondary level in shared time AVTS.
2. Each school was visited to collect the necessary data for the study.
3. Costs incurred by the schools consisted of current operating expenditures and capital outlay expenditures associated with equipment and physical facilities.
4. Costs were determined in terms of a full-time student equivalent.

Conclusions: Some of the study conclusions noted were:

1. The study found higher student costs among smaller AVTS and the theory of "economics of size" was supported by this study.
2. The size of school and expenditure relationships are of improtance for planning purposes.

Osburn, D. D., and Richardson, W. B., Jr. "Cost and Benefits of Junior College Trade and Industrial Education," Journal of Industrial Teacher Education, Volume 12, Number 1, 1974.

Purpose: The main purposes of this study are:

1. To determine the per student cost of two-year junior college trade and industrial education programs.
2. To determine the economic benefits occurring to students who had completed programs in trade and industrial education.

3. To evaluate the trade and industrial education programs by use of cost-benefit analysis.

Procedure: Study activities include the following:

1. Cost data was estimated for five curriculum areas.
2. The cost data were summarized and the average cost per program was determined.
3. The average annual cost were doubled to arrive at a two year cost figure.
4. A wide variety of accounting procedures found in the districts necessitated the development of a cost rationale for the treatment of cost data.
5. Costs were summarized into two areas: current costs (administrative costs, instructional, operational and maintenance), and equipment costs (annual depreciation value of the equipment outlays).

Conclusions: Some of the study conclusions noted:

1. The aero and aviation mechanics curricula were the high cost programs.
2. Auto mechanics and drafting were the low cost curricula.
3. Should program costs be the only criteria of program evaluation, drafting would be ranked as the number one program and engineering technology last.

Peat, Marwich, Mitchell and Co. A Cost Effectiveness Analysis of the Vocational Education Program in Puerto Rico. ED 073 303. New York: 1971.

Purpose: The major purpose of this study is to assist the decision makers in the allocation of funds for vocational school programs.

Procedures: Study activities include the following:

1. A cost effectiveness analysis of vocational programs administered by the Department of Education.

2. Determination of variations in unit cost of programs.

3. Identification of factors contributing to variations in unit costs.

Conclusions: Some of the study conclusions noted:

1. There are considerable cost variations among the school districts.

2. Cost variables depend heavily on the number of graduates by school districts as well as the number of courses offered under a program.

Roberts, C. T., and Lichtenberger, A. R. Financial Accounting: Classifications and Standard Terminology for Local and State School Systems. Washington, D.C.: U.S. Government Printing Office, 1973. (DHEW Publication No. (OE) 73-11800. $2.35 post paid.

Sorenson, W. A Proposed System for Predicting Costs of Vocational Education Programs in the California Community Colleges. Final Report. ED 073 236. Santa Clara: West Valley Joint Community College, June, 1972.

Purpose: The purpose of this study was to develop a system for predicting current instructional costs of vocational education programs as conducted by the Community Colleges of California.

Procedure: Study activities include the following:

1. Identification of the current instructional costs of vocational education conducted in the community colleges of California.

2. Data needed for this study fell into three major categories and the three were institutional data, vocational education program cost data, and average instructor-to-student ratio or weekly student contact hours for each vocational education program.

Conclusions: Some of the study conclusions noted were:

1. It would appear that there are variables other than those used in the prediction formulas that should be considered when developing a formula for predicting vocational program costs.
2. The size of the enrollment within a vocational program appears to have an influence on the per student cost.
3. Accounting procedures should be established which permit the ready identification of expenditures by vocational program areas.

APPENDIX E

REVIEW OF LITERATURE

ROSE KOCINSKI

REVIEW OF LITERATURE

INTRODUCTION

For the past decade and a half, investigators have been determining the cost of educating Americans with varying degrees of success. The forces operating within and upon the educational system have both facilitated and impeded economic analysis of costs. With rapid tightening of funds in all segments of the economy, the forces seeking cost accountability and efficiency in education are understandably increasing.

Cost analysis is an essential practice in the private sectors of the nation's economy but is a relative newcomer to the field of education. Perhaps the greatest impetus to such analysis has come from the increasing involvement of the federal government in the field of education, particuarly vocational education as a result of the Federal Vocational Act of 1963 and Vocational Education Amendments of 1968. Among other things, these legislative acts placed new emphasis on evaluating the results of vocational education, giving rise to a flurry of federally funded studies of cost analysis (Lecht, 1974).

Traditionally, school accounting systems have been established along administrative budgetary lines which more or less have been useful in planning and management decision making (Lee, 1970). The federal government recognizing the widespread use of the varied accounting systems, published a handbook in 1957* in an effort to encourage local and state school reporting agencies to conform to some standardized guidelines in order to facilitate reporting and record keeping at the national level.

"Educational administrators have always been obliged to pay attention to costs" (Coombs & Hallak, 1972, p. xii), especially in terms of budgets, however, this practice has not and does not suggest a "cost-consciousness" in the sense of analyzing costs for purposes of evaluation, planning, policy making and general improvement of cost effectiveness (Coombs & Hallak, 1972, p. xii). Public education accounts originally designed to serve the purposes of appropriations bodies and auditors characteristically list expenditures by object such as teachers salaries, instructional supplies, utilities not by function or program objectives. As written, budgets allow legislators to see how much more of the taxpayers' monies is being spent this year than last year or five or ten years ago, but they do not tell the legislators for what specific purposes the money is being expended or what results are expected or have been attained. In short, they do not tell what society is getting for its money (Coombs & Hallak, 1972).

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*Note: This handbook is now available as a 1973 edition.

Like so many governmental services funded with taxes, education "does not have a profit and loss statement" (Coombs & Hallak, 1972, p. xii) which in effect exempts it from principles of efficiency. This is even more strongly the case when educational costs are based on needs which are increasing rapidly and bringing along with them spiraling costs. Many communities and indeed nations of the world are facing increasing financial strain in meeting their enormous and urgent educational needs. According to Coombs and Hallak, the number one problem of education today is how to get more and better education from the resources available. Solutions to this problem require critical self-examination and the most useful tool available to accomplish this is system's analysis.

Like many new ideas, cost analysis has its critics. Like many ideas that have been advanced for widespread use, it has been modified by those who have "taken it on" to the point where it is unrecognizable from the existing system it is replacing having been made to fit the system in use. On the other hand, there are school districts using it successfully particularly those that have use of computer services.

IDENTIFYING THE CONCEPT OF COST ANALYSIS

Kaufman (1968) has presented an excellent discussion of cost effectiveness analysis and cost-benefit analysis in which he decries the well established and wide spread practice on the part of educators to base the costs of education upon needs. It is his position along with others that it is no longer tenable for educators to merely identify their educational needs and expect government agencies to supply them with the funds to meet them. To refer to costs or needs alone, which has been and remains the established practice of many today, is unjustifiable in view of the ever increasing competition of education with other institutions for available funds. In other words, it is not possible to talk about costs without referring to payoff or talk about meeting needs without talking about the cost of doing so (Kaufman, 1968, p. 3).

While this position seems simple enough it has been extremely difficult to implement. Perhaps the rather complex trappings in which it is enveloped have taken on more meaning than the principle itself. Nevertheless, it remains basic to the variety of cost analysis approaches and techniques.

Reinhard and Blomgren (1969) define the concept of cost benefit analysis as "a technique for comparing the relative economic efficiencies of competing programs" (p. ii). Looking at this definition in terms of the economic principle noted above, it describes cost benefit analysis as a method of evaluating the economic efficiency of differing means to desired ends or objectives. As one focuses on vocational education, the concept of cost benefit analysis answers the question of whether the economic benefits of vocational education are equal to or greater than the economic costs. By providing a criterion for decision making, it allows decision makers to allocate a finite set of resources among numerous competing needs (Lecht, 1974).

PURPOSE OF COST BENEFIT ANALYSIS

As the definitions imply, cost benefit analysis permits administrators and decision makers to assess existing vocational education programs or those being planned in terms of their value to the learner and society in relation to their cost to the learner and society. Such analysis allows legislators, school officials and taxpayers to obtain answers to questions that ask:

> What controls do we have over public education?
>
> What incentives are there for the public educator to keep costs down?
>
> What evidence is there that public education is being provided efficiently?
>
> What evidence is there that objectives are being met? (Kaufman, 1968, p. 5)

More specifically cost benefit analysis provides answers to the question of whether the sum of the benefits of any program exceed the sum of the costs. It also describes how the costs and benefits of one means to an end compare with another or alternate means. The answers obtained enable the broader concerns of the previous questions to be dealt with.

IMPLEMENTATION OF COST BENEFIT ANALYSIS

The frequent use of the word "educational system" as a reference to the structure of the institution, belies its essential meaning as an integrated, dynamic whole with related and interacting parts influencing and influenced by each other and the socio-economic environment of which it is a part (Coombs & Hallak, 1974). When one views the educational system in this manner, systems analysis serves as a useful framework by which to examine educational costs. Coombs and Hallak (1972) have identified five cardinal features of an educational system viz., 1) objectives, 2) outputs, 3) benefits, 4) internal process, 5) inputs (pp. 79-82), which help clarify their relationships.

Objectives - are the educational system's reason for existing and its only claim to a share of the nation's and/or a community's resources. An educational system almost always has a number of objectives, in competition and in conflict with each other requiring their ordering according to priority. Any action aimed at evaluating the system begins with a clear picture of its objectives and their priority.

Outputs - are all the capabilities and aptitudes a student carries away from an educational system beyond what he brought into it initially. They are the educational value added to the student by his exposure to a particular educational process. Achievement tests are a partial measure of outputs. More important is the assessment of the degree to which student's learning approximate objectives of the system and fulfill the students' and society's needs.

Benefits - are the long term advantages that accrue as a result of educational outputs. Benefits are social as well as economic for the individual and society, but subject to forces outside the control of educational systems and, therefore, constitute a more precarious dimension.

Internal process - describes the various operations of an educational system that produce its short-term outputs and long-term benefits.

Inputs - are the various physical and financial resources needed by an educational system in order to function.

These five features of an educational system and the relationship between them when examined in terms of their relevance to each other provide the tableau for defining efficiency and productivity.

Perception of an educational system as a whole comprised of several integrated parts must be extended to cost benefit analysis. Thus as an analytic tool, it can be separated into several components - 1) objectives and goals, 2) the alternatives, 3) costs, 4) constraints, 5) the model (Reinhart & Blomgren, 1969, pp. 5-8).

Objectives and goals - are the starting point for any cost benefit analysis. Since most objectives are stated in terms that are usually difficult to measure objectively or to quantify in monetary terms, they are restated as specific measurable terms called goals.

Alternatives - are the various means to given ends. That is they are the processes by which goals can be reached. For any given goal there may be several alternatives and vice versa.

Costs - identification of costs for each alternative poses the greatest difficulty, second to translating vague, global objectives into concrete, measurable goals. The necessity of relying on any school's financial records organized along administrative lines requires skill and imagination in unearthing pertinent data.

Constraints - are the limitations imposed by the needs and wants of society and are evident in all parts of the analysis.

Criteria - are the standards or rules by which the benefits and costs are judged.

Model - is the mathematical or literary statement which brings together all the components of cost benefit analysis into an analytic tool.

TECHNIQUES OF COST BENEFIT ANALYSIS

Davie (1965) advocates marginal analysis over examination of total contributions of a program to the achievement of an objective. Marginal analysis requires the decision maker to compare the addition or reduction of specific expenditures and the resulting increase or decrease in some specified program objective over average costs. It requires the decision maker to be aware of the economies of adding or deleting programs, courses, student support personnel, etc. in relation to marginal costs. This technique is particularly useful in situations where economies of scale hold true over time.

Kaufman (1968), however, notes that the cost of educating an additional student (marginal student) in a vocational technical high school is higher than for the non-vocational student. While he observes that the average daily attendance at which costs can be minimized has been computed for non vocational-technical high schools, no similar data are available for vocational-technical high schools. The use of marginal studies as a technique for evaluating vocational-technical education frequently employ inaccurate statistical models and do not contribute usable information for determining costs according to this author.

MODELS OF ECONOMIC ANALYSIS

Most analytic prototypes have as their purpose the guidance of decision makers in current and projected educational investments. The concept of cost in most models includes more than money; it includes the expenditure of all resources which might otherwise be available for other uses. Benefits at the other end of the model are those occurrences that emerge from defined alternative courses of action. The alternatives which come closest to achievement as stated goals at least cost are viewed as most desirable (Kraft, 1969).

Soong, et al. (1971, pp. 10-12) discuss several models commonly employed in cost-benefit analysis. The Investment Model is frequently used in analyzing educational systems. In this model, inputs both immediate and deferred are perceived as investments to be discounted against different payoffs or rates of return over a period of time. A variation of the investment model is the Human Capital Model which equates tapping of human resources, oil for example, which produces high yield only after considerable effort in development. Another model

Allocation of Resources Model is predicated on a finite amount of time and money. Its purpose is to maximize returns through the selection of the best options from among several.

Each of the models described is a demonstration of systems analysis at work. Each considers the constraints imposed and the appropriate alternatives to goal achievement, or the output. The output of many cost sub-models are the input of others that are concerned with the additional dimensions of a total systems analysis.

Clark (1967) has devised a model whereby educators can evaluate alternative decisions and derive cost determinations for schools when planning the construction of new school plants. The model is used to consider demographic characteristics such as location and mobility of the population, pupils, and the public transportation network as they relate to location, enrollment and facilities in an urban area. His model is one of several "exante" decision tools in which the output of one serves as input for another.

McGuffy (in Kraft, 1969a, p. 273) discusses demographic projections such as population mobility, age structure, neighborhood growth or deterioration and job obsolescence as they affect school plants. He offers a formula using inputs like those noted to assist planners make sound decisions to abandon or retain a given school building.

O'Brien (1967b) in discussing the construction and use of school sub-model for large urban schools identifies the kind of information essential to making decisions regarding allocation of resources. Like Clark he uses the outputs of one sub-model as input for another. Allocation of floor area space of the school plant to various student requirements on a per pupil basis form the sub-model's mathematical input. The output in O'Brien's sub-model equals the total floor area of building space required for regular instructional areas. The mathematical derivation of staffing requirements and student program participation provide other information necessary for decision making and also act as input for subsequent cost and effectiveness models (1967b, p. 11).

PROBLEMS IN IMPLEMENTING COST BENEFIT ANALYSIS

Cost benefit analysis encounters many difficulties when applied to education. As noted earlier, the first confusion arises when one tries to translate the generalities described as objectives into goals to which one can attach measures. How are hard-to-measure abilities such as judgment, social competence, analytical capability or personal orientation quantified since they account for a great deal more than skill in reading, arithmetic, or chemistry, for example, when one examines the lives of successful people in our society (Mood & Powers, 1967, p. 3). The vast number of interactions within the educational system and between it and its socio-economic environment present difficult but not insurmountable problems in accurate measurement of educational outcomes (Coombs & Hallak, 1972).

Kaufman refers to a number of misconceptions about cost benefit analysis including the notion that it is merely subterfuge for conducting education on a least cost basis and the belief that a cost benefit analyst substitutes his judgment for that of the administrator. While misconceptions such as these can be easily corrected with factual evidence to the contrary the barriers they impose against the adoption of cost benefit analysis by school districts remain strong.

Because cost benefit analysis is recognized as an evaluative technique, it has been viewed by many school administrators as an attack upon their institutions (Kaufman, 1968). "Defensive attitudes have been erected as shields against cost benefit analysis and these attitudes are reflections of a failure to separate conceptually an institution form the internal processes within it" (Kaufman, 1968, p. 11).

Cost benefit analysis of vocational programs which are almost invariably services by more than one administrative unit are difficult to implement successfully. Administrative line items which cut across many programs present a major hurdle for investigators since many individual program costs are obscured and difficult to find much less extract from their categorical placement. The resulting reliance of many analysts as well as researchers upon personnel with knowledge and skill in making estimates of such costs is a necessary but questionable practice that reduces the validity of studies utilizing such sources of cost data. Thus the availability of administrative type data rather than process type data impedes the implementation and adoption of cost benefit analysis.

Kotz (1967) points to an overall "lack of integration between the substantive programming of vocational education courses and fiscal planning on the state and local level" (p. 211). The general lack of cost data collection according to primary occupational categories or by specific course offerings remains a persistent problem.

PROGRAM PLANNING BUDGET SYSTEMS - PPBS

The major application of systems analysis has been vis-a-vis program planning budgeting systems. It has been conceived as a guide for policy decisions and an instrument for effective management. Systems analysis is an integral part of the PPB system. It allows decision makers to implement the economic principle stated earlier, i.e., maximizing benefits for a given level of costs or minimizing costs for a given level of benefits by facilitating explicit, quantitative analysis of data. PPB systems include benefit cost analysis and effectiveness cost analysis. They offer a means for developing "program structure and related multiple year budget programs that" have consideration of alternative courses of action built into them (Kotz, 1967, p. 211).

Progress is being made in the area of cost determination in school districts using program budgeting. Some unfortunately are no more than "doctored up" administrative budgets but even at that, they are a step in the right direction. Cost data is an important factor in decision making and in view of the millions of dollars involved, it takes far too big a bite of the total revenues to be left to someone's "ball park" estimation (Coombs & Hallak, 1972).

METHODS OF COLLECTING COST DATA

An essential task of cost analysis is collection of relevant data. Since analysis is on a program or course track, input data must be identified accordingly. Kotz suggests method whereby a school can account for expenditures by major program categories such as agriculture, distributive education, health occupations, office education, technical education, and trade and industrial education. Each is subdivided into its sub-courses and further divided into their elements.

McGivney (1970, pp. 92-99) notes that comparing comparable programs and their objectives requires inputs identifying cohort of students in a particular program -

their age, sex, race, socio-economic background, I.Q. at time of program entry, identity of teachers for each program, their education and specialties, the curriculum materials, physical facilities and supporting services. Output is measured by number of graduates from a program, proportion entering the labor force, proportion employed in relevant occupations, percent in irrelevant occupations, average earnings for each group, average of job outs and drop outs over given time periods. Reinhart and Blomgren recommend capital costs be determined on a cost per student contact hour basis although they admit this type of measure is almost impossible to obtain. Coombs and Hallak observe that capital items, such as land, buildings and equipment, that are used over a period of years are amortized over their useful lifetime and charged to each year of service. Such accounting of capital costs causes them to assume a rather small fraction of total costs in a given year and consequently of total cost per student (total cost being the sum of current costs and capital costs). Current costs are defined by these authors as those that are expended in one fiscal year and must be replaced regularly.

Most studies of cost analysis have characteristically utilized the recommendations of the U.S.O.E. Handbook II Financial Accounting for Local and State School Systems, Standard Receipt and Expenditure Accounts, 1957, listing direct and indirect costs. The types of variables considered are those that are quantifiable and explained in economic terms. Some major modifications of this system have been engendered by the growing use of program budgeting, leading to the 1973 revision of the handbook by the U.S.O.E. to conform to the requirements of the newer budgeting and accounting format. There will be, conceivably, great variation in how local and state school systems employ these recommendations and to what extent. Nevertheless, the handbook offers a common resource to educators and administrators within educational systems and is the major referent here.

CONCLUSION

Kaufman (1968) has observed that cost benefit analysis is being done implicitly every day an administrative decision to spend more or less money on one program rather than another is made. According to this author vocational administrators in particular are being asked to state explicitly the process by which their decisions are made which exposes the process to the judgment of others. Its correctness or the lack of it, obvious to others, permits better decisions to be made regarding the allocation of limited resources for achieving desired educational ends.

Theoretically, cost benefit analysis offers many advantages over the traditional cost accounting system that was geared to meet the financial needs of the system. It is basically a way of thinking about educational systems that is larger in scope and influence and certainly more sophisticated than the system it is seeking to replace.

STUDIES OF COSTS OF VOCATIONAL-TECHNICAL EDUCATION

A review of the literature concerning the identification of the cost of vocational education reveals a wide variety of approaches to its determination. The factors isolated for audit tend to be similar, however, the techniques used to arrive at cost figures show wide differences. All investigators of studies recognize a common difficulty which is translating general accounting cost classifications into program accounts that are more amenable to analysis.

To overcome the difficulty encountered with traditional accounting systems, many researchers have resorted to manipulation of cost figures to fit existing accounting formats through elimination of some they deemed irrelevant, consolidation of data or averaging which has resulted in data of questionable utility. Most of the studies reviewed are limited by the availability of data in financial reports of various schools which accounts for many of their concessions and limitations.

Another problem encountered by researchers beside those imposed by school accounting procedures is the lack of consistency in reporting and recording data among different schools. Costs tend to be obscured by their assimilation into larger expenditure accounts and these in turn are accounted for according to the particular system favored by the individual in charge. Even though states do adhere to national reporting recommendations and formats the guidelines are rather general which allows for much individualization in interpretation at the local district level.

Most investigators of costs of vocational education have recognized that costs, their identification, determination and quantification have little meaning or value until they are considered along with results. Educational results in turn must be considered in light of the objectives of the school, program or project that is being studied. Recognizing that costs are only one side of the equation which in its complete form identifies educational resource inputs with educational outputs or benefits, mosts studies consider both to varying degrees. Studies of cost-benefit analysis that were reviewed concede as a major difficulty the problem of accurately and appropriately quantifying educational objectives.

On the whole, studies of educational costs and benefits conducted during the last decade were directed primarily toward obtaining relevant data by which analysis could be made. More specifically they were attempts at determining costs of vocational programs and costs of general education programs (Cage, 1968; Corazzini, 1966. Deuker & Altman, 1967; Kraft, 1969, Swanson, 1969). A number of them were designed to compare obtained costs of vocational education with general education, that is, to determine excess costs of vocational education programs at the secondary and post-secondary levels (Cage, 1968; Corazzini, 1966, Deuker & Altman, 1967, Lindeman, 1970; Swanson, 1969).

Much effort has been devoted to identification of cost variables and the development of formulas for computation of costs of vocational education based on some unit of measure (Corazzini, 1966; Deuker & Altman, 1967, Harris, 1973; Lindeman, 1970; Swanson, 1969; Tomlinson & Rzonca, 1971). On the other hand, considerable research activity has been concerned with the development of models for the evaluation of urban educational systems (Clark, 1967; O'Brien, 1967a, 1967b).

DETERMINATION OF COST VARIABLES

Woerdehoff, et al. (1960) were among the early investigators whose extensive accomplishments not only included the determination of the various trends in vocational education but also the appraisal of vocational agriculture and industrial education in Indiana high schools. Their work included the identification and correlation of nineteen independent variables that identify program resources both material and human with one dependent variable called the operational aggregate for a program. The latter concept embodies the activities of the program along the teaching-learning dimension. While this investigation orients the reader to some very interesting results concerning the effect of teachers on learning of pupils, no information pertaining to per pupil cost is offered.

In his effort to demonstrate cost effectiveness of manpower training programs, Young (1964) defines direct and indirect costs of education. Direct costs are those outlays necessary to conduct programs such as cost of training material and instruction. Indirect costs [are those] which provide a capability to carry on effective training and include teacher training and administration costs (p. 4).

In determining the cost of constructing or renting space required for vocational education, the author notes that 150 square feet per student is used as a standard with a variation of 50 square feet more or less for auto mechanics and typing respectively. When dealing with equipment costs Young points out that purchasing equipment to "tool up a shop" in considered a development cost rather than an operating cost (p. 11). Furthermore identification of equipment cost per trainee is not included by the investigator since this involves amortizing the cost of the equipment over its life span and then in terms of the number of trainees per year per piece of equipment (p. 11).

Corazzini in a later study (1966) also omits yearly expenditures for equipment and school plants "to avoid wide variations in per pupil costs" (p. 33). Per pupil costs deal only with current account items and include for each school year "implicit rent and tax loss estimates based on present book value estimates of plant and equipment plus capital outlay for the year" (p. 119). Current and capital costs for any year's operation are equally distributed among all the grades in the school under consideration by the researcher.

Deuker and Altman (1967) have examined available vocational education cost information over a three year period to determine the feasibility of computing per pupil cost from such data. These investigators relied upon questionnaires to obtain information, however, an on-site visit to the participating agencies was required to complete them. Cost factors selected by Deuker and Altman are from the 1957 edition of the Financial Accounting Handbook. They are:

> attendance services, health services, pupil transportation services, operation of plant, fixed charges, food services, student body activities, salaries for instruction, textbooks, library, audiovisual materials, teaching supplies, other expenses for instruction, plant maintenance and capital outlay. (pp. 19-22)

School type, that is, vocational or comprehensive, curriculum type and administrative policies and practices are cast as independent variables in this study. Cost per student and graduate performance are identified as dependent variables. The authors have placed the above information into a formula for determining cost per student hour (p. 33). Benefit variables of job security, job relatedness and job satisfaction are also quantified by various formulas (pp. 34-35).

Problems encountered by these researchers are several, chief among them being the difficulty in extracting and analyzing cost data that is amenable to analysis along performance lines when traditional methods of accounting are used. Attrition among the original sixteen participating schools within the various states consenting to take part in the study left the researchers with only nine schools as a sample. The extremely small sample size netted inconsequential results.

The cost analysis of selected post secondary educational programs in Iowa Community Colleges conducted by Cage (1968) attempts to ascertain the unit cost for selected vocational programs and compare it to costs of transfer curriculum in the arts and sciences. In calculating a current unit-cost-per-student contact hour for each curriculum, a data base very similar to but not as specific as that utilized by Deuker and Altman was obtained at the participating colleges. Like the other researchers cited earlier, this author does not include initial investment in buildings or equipment nor are they depreciated. Cost of repair and replacement of equipment is, however, considered among current costs.

Cage has classified direct expenses of a program into five areas: 1) instructional services, 2) fixed charges, 3) maintenance and repair of equipment, 4) minor equipment and remodeling, 5) other operating expenses. Indirect expenses are pro-rated among vocational-technical programs and those of the arts and sciences. These indirect costs include: 1) salaries of administrators, guidance directors, counselors and librarians, 2) board of directors, 3) superintendent's office, 4) operation and maintenance of local campus.

Total full time equivalent enrollment in vocational-technical education and in the arts and sciences curricula and pupil contact hours contribute other quantifiable information necessary for computation of the current cost per student contact hour. The findings that vocational-technical programs tend to be more clostly than others mirrors the findings of the other researchers cited except Deuker and Altman whose results are to the contrary (p. 12).

Extensive listings of direct and indirect program costs are offered by Kraft (1969b) in his pilot study of cost effectiveness of vocational-technical programs in Florida. The determination of specific costs for particular programs using information couched in the traditional accounting format poses less of a problem for the investigator than does determining educational outputs. Kraft notes that variation in cost among schools or programs is a reflection of differences in size of school population, hours of instruction and quality of equipment and material to list a few sources. Unless these variables are held constant, comparisons of costs among programs are not valid according to the author. Formulas for computing various costs and cost-utility determinations require very careful study and considerable expertise in statistical interpretation (pp. 94a-100; 131-139).

The pilot study directed by J. C. Swanson (1968) in which determination of the unit costs for vocational is one of the objectives has as its basis for comparison the weekly student contact hour. The costs are classified as: 1) direct classroom expense and includes teacher salaries and fringe benefits, 2) quasi instructional services such as supervision, leaves, and study hall aids, 3) non teaching services which include the school administrators and clerks, curriculum development, guidance, library and audiovisuals, student activities, director, community relations and building and grounds, 4) school district central services which include general administration, business services, general supervision and curriculum development (fixed assets and capital outlay are not included in this analysis), 5) abatements assumed by negative costs due to services and products sold by students (p. 19).

A major concern of this study team is the "equitable distribution of all expenditures, direct and indirect to programs of instruction on the basis of a reasonable unit" (Swanson, 1969, p. 20). Thus pro-ration of custodial services could be on a square foot of floor space used for a particular program and personnel services based on number of hours devoted to a program.

The relative completeness of data collection is reflected in Erick Lindeman's study Financing Vocational Education in the Public Schools. Part of a three year comprehensive national project to devise models for evaluating and financing education. This author claims it is necessary to classify all current public school expenditures into three major classifications if costs of education are to be determined accurately. The categories are: 1) direct costs of instructional programs, 2) indirect costs of instructional programs, and 3) costs not charged to instructional programs (p. 22). Using the 1957 issue of the Financial Accounting Handbook, Lindeman has placed all current expenditures into nine categories:

Administration
Instruction
Attendance and Health Services
Pupil Transportation Services
Operation of Plant
Maintenance of Plant
Fixed Charges
Food Services and Student Body Activities
Community Services (p. 23)

which are similar to the cost variables identified by Deuker and Altman. Each category in Lindeman's study is further expanded to include the appropriate expenditures charged to it. For example, under the category Instruction consultants or supervisors, teachers, other instructional staff, such as librarian textbooks, school library, audiovisual materials, and teaching supplies are included. Indirect costs in this study are those costs not identified with any one program which are pro-rated among all instructional programs. Expenditures classified as administration are indirect costs and include superintendent's salaries, cost of office of business administrator, pupil transportation, attendance and health services, food services, study body activities plus plant operation and maintenance and fixed charges (p. 24).

The study offers the above information as a guide along with discussion of direct costs accounting systems utilized by schools within fifteen participating states. The discussion focuses on various cost accounting practices and the presentation of various data collection forms designed to meet the needs of the particular states. Referring to the problem of equipment costs, Lindeman notes that

> in public school accounting, the concept of depreciation is seldom used except for the purpose of determining the insurable value of buildings and equipment. (p. 11)

> . . . .
> Therefore, the cost of vocational education developed in this study excludes annual depreciation allowances. Only current expenditures, including repair and replacement of equipment are calculated in the annual cost per student for vocational education. (p. 11).

Lindeman identifies the total direct cost of an instructional program as the sum of A+B+C.

A. Program Administration
   1. Program Director Salaries
   2. Assistants Salaries
   3. Director's secretarial salaries
   4. Travel and office supplies

B. Instruction
   1. Program Supervisors Salaries
   2. Program Teachers Salaries
   3. Other Salaries of Instruction for Program
   4. Textbooks for Program
   5. Teaching Supplies for Program
   6. Other Expenses for Program

C. Maintenance of Plant
   1. Repair and Replacement of Instructional Equipment for Program (p. 16)

Compilation of indirect costs require careful attention by the investigator to the provision of state or federal aid for some services since their placement under indirect costs would lead to duplication of reimbursements. The author uses transportation services to illustrate this point and has placed this service under Pupil Services which prevents it from being charged to an instructional program when such aid is provided.

In their analysis of program costs of a sample of six community colleges during 1968 and 1969, Tomlinson and Rzonca (1971) found that "size of enrollment in individual classes is the most significant variable affecting the cost per student credit hour, the course cost, and the program cost" (p. 1. In their recommendation for collection of data the authors advocate allocation of expenditures must be made to the student who is the product of educational system. They also claim that current per student costs indicate dollar return in appropriate computation, and that per student cost is better used in statistical planning and methods of fund retrieval (p. 152). Their observations regarding the influence of enrollment of costs leads them to state that

> numbers of students . . . affect the cost of the program but they do so within limits. In relation to instructional time and salary, the costs would virtually be the same whether five students or fifteen enrolled in a course. . . . Regardless of enrollment, certain capital expenditures must be made and a certain amount of facility space provided. (pp. 152-153)

Recurrent costs or operational costs of a current year and capital outlay costs incurred in a program are the financial parameters utilized by the investigators.

CONCLUSION

The studies cited indicate there is little agreement regarding underlying theory upon which to base study methodology and approach. Determination of educational costs is essentially a fact finding experience in which the investigators juggle the information obtained and obtainable into a form that is useful to their investigation. They offer little data that is generalizable and suggest to this researcher that one must create a model for data collection and analysis that circumvents the shortcomings of the methodologies mentioned.

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Cage, R. Cost analysis of selected educational programs in the area schools of Iowa. Ames, Iowa: Iowa State University of Science and Technology, 1968. (ERIC Document Reproduction Service No. ED 025 639)

Purpose: The primary purpose of this investigation is to identify cost differences between vocational-technical programs and arts and sciences transfer curricula. Secondarily, the author seeks to determine relationships among the amounts and sources of funds received by the participating institutions.

Method: A sample of 15 post secondary institutions, consisting of four area vocational-technical schools and eleven community colleges used to obtain current unit-cost-per-student contact hour in specified curricula based on average cost per student. Data obtained through visits to the schools and classification of information into direct and indirect costs according to 1) instructional services, 2) fixed charges, 3) equipment maintenance and repair, 4) minor equipment and remodeling, 5) other operational expenses. Initial expenditures for capital outlay and equipment not included in tabulation. Also excluded from consideration are depreciation on buildings and equipment.

Conclusions: Comparison of costs indicates a wide range of differenes across the state. Generally speaking, clerical office practice cost-per-student are lower than cost-per-student in the arts and sciences transfer curricula. On the other hand, cost-per-student-per-contact-hours are four times as high in welding and auto mechanics. Programs with fewer than ten students are associated with higher costs and a strong inverse relationship observed between enrollment and costs Wide variation also observed in amounts of funds raised by local taxes.

Coombs, P., & Hallak, J. Managing educational costs. New York: Oxford University Press, 1972.

Purpose: One of several volumes which contain the report of a large scale international study of the use of cost analysis in education conducted by the International Institute for Educational Planning. The study, initiated in 1968, describes the experiences of different nations with effective and ineffective educational planning techniques.

Method: This text presents information about cost analysis as applied to education. The purposes of cost analysis, its importance in decision making and how it has been used in several nations constitutes the bulk of the contents. Guidelines for educational planners are offered in non-technical terms.

Conclusion: The authors defend the use of cost analysis as an effective means by which educational quality can be improved.

Corazzini, A. J. Vocational education, a study of benefits and costs (a case study of Worchester, Mass.). New Jersey: Princeton University, 1966.

Purpose: To determine costs of various vocational programs and the amount of return on the investments made.

Method: A wide scale cost-benefit analysis among secondary vocational-technical programs and general education programs. Per pupil costs concerned with current account items. Cost of rent on buildings, grounds and equipment estimated at eight percent of book value of these physical properties. Estimate of building depreciation is two percent per year and 10 percent per year on equipment using Schultz method. Methods of computing ratios of benefits to costs include computation of foregone earnings, value of workers to local industry within established time periods, post-high school training requirements, drop outs, prevention of drop outs, and mobility of graduates.

Conclusion: Vocational education is more expensive than general high school education due to doubling of teacher-pupil ratio is vocational education primarily. A notable exception is the program of Practical Nursing in which costs are much less due to higher pupil teacher ratios. Benefit cost considerations include major attention to maximization of constrained funds by computing ratios of benefits to costs for each educational project or program.

Davie, B. F. Using benefit-cost analysis in planning and evaluating vocational education. A paper prepared for D. S. Bushnell, Director. Washington, D.C.: Division of Adult and Vocational Research, Bureau of Research, U.S. Office of Education, November, 1965. (ERIC Document Reproduction Service No. ED 016 077)

Purpose: The paper explores the use of benefit-cost analysis in planning and evaluating vocational education.

Method: The author discusses the translation of specific program objectives into quantifiable terms and the listing of alternatives to achievement of objectives as essential to cost benefit analysis. He advocates use of marginal analysis rather than examination of contributions of a total program in evaluating the effectiveness of an existing or proposed program. Marginal analysis requires the decision maker to compare the addition or reduction of specific expenditures and the resulting increase or decrease in some specified program objective. The law of diminishing returns is one axiom that every decision maker should keep constantly in view. Marginal analysis includes determination of total cost of a marginal program element over its entire life, including its support costs and the relationship of these costs to calculated gains. The relationship of time is an important consideration.

Commentary: A brief description of the characteristics of cost-benefit analysis and its uses in non-technical terms.

Deuker, R. L., & Altman, J. W. An analysis of cost and performance factors in the operation and administration of vocational programs in secondary schools. Final report. Washington, D.C.: Bureau of Research, U.S. Office of Education, October, 1967. (ERIC Document Reproduction Service No. ED 019 516)

Purpose: To identify costs and similar data that can be obtained to assist in the planning and evaluation of vocational education. To obtain and organize data concerning cost, operational, situational and performance factors which can be used in lieu of data based on large scale samples and to compare vocational and non vocational program costs in comprehensive high schools.

Method: Questionnaires sent to original sample of 16 comprehensive high schools and 16 vocational schools across the country to obtain information concerning financial expenditures, enrollment, faculties, job characteristics of graduates. Data requested covers a three year period. Of the original sample, four comprehensive high schools and five vocational schools participated in the study. The detailed questionnaires required visits to the participating schools by the researchers in order to complete them.

Conclusions: Due to the small sample size the findings that academic-general course costs are higher than vocational course costs which is contrary to most research findings is most likely due to large random error. School type is held as the most important single variable in determining cost, however in schools surveyed, the available cost data do not lend themselves to systematic, objective analysis. High and low performance schools rated as such according to graduate performance data obtained are identified.

Kaufman, J. J. *Cost effectiveness analysis as a method for the evaluation of vocational and technical education*. Washington, D.C.: Bureau of Research, U.S. Office of Education, December, 1968. (ERIC Document Reproduction Service No. ED 029 983)

Purpose: A report of cost benefit analysis utility in education. This paper includes the findings of a study conducted by the Institute for Research on Human Resources at Pennsylvania State University which attempted to determine whether or not vocational and technical education obtains some beneficial returns.

Method: A concise presentation of the characteristics of cost analysis, its purposes and limitations. The contribution of cost benefit analysis to change and innovation in education and the prevalent misconceptions concerning it are discussed. Since cost-benefit analysis is so closely linked to evaluation, the author furnishes the reader with a brief orientation to this concept.

Commentary: This paper presents a strong case for cost benefit analysis as applied to education. It is very useful as an initial reading for the novice who is becoming familiar with the concept of cost benefit analysis.

Kotz, A. *Occupational education-planning and programming* (Vol. 2). Menlo Park, Calif.: Stanford Research Institute, September, 1967. (ERIC Document Reproduction Service No. ED 017 734)

Purpose: A collection of essays on various aspects of benefit-cost analysis. Offers comprehensive views of special topics concerned with the broad area of systems analysis.

Method: Volume two is divided into three parts, the first dealing with program structure and budgeting, the second focusing on conduct of systems analysis and the third part with problems of evaluation and organization. Within each are several papers discussing some relevant topic.

Commentary: A good source for persons seeking specific information about the topics covered in this volume. Some familiarity with the concept of cost-benefit analysis is necessary to understanding and appreciating the views of the contributing authors.

Kraft, R. H. P. (Ed.). Strategies of educational planning. (Proceedings of the Annual Conference on the Economics of Education). Tallahassee, Fla.: Educational Systems Development Center, Florida State University, September, 1967. (ERIC Document Reproduction Service No. ED 027 615)

Purpose: To inform readers of the developments that have taken place in educational planning that has utilized systems analysis. The potential of systems analysis as applied to educational planning is also presented.

Method: Eight papers each concerned with an aspect of systems analysis in educational planning and long-range planning in public education form the text. The content of the papers is characteristically sophisticated requiring a considerable degree of knowledge of the concept on the part of the reader.

Commentary: A useful resource for educational planners and decision makers familiar with the concept of systems analysis as applied to education.

Kraft, R. H. P. Cost effectiveness analysis of vocational-technical education progress. A pilot study, final report. Tallahassee, Fla.: Florida State University, June, 1969. (ERIC Document Reproduction Service No. ED 034 055)

Purpose: To identify public and private costs of selected vocational-technical programs and develop a model which can be used in planning the allocation of resources. Future implementation of Planning, Programming, Budgeting Systems through provision of basic conceptual tools obtained from the study is another goal.

Method: The sample consists of selected course and program offerings in one secondary school and one post secondary school. Data collection in the areas of direct and indirect costs, student and faculty composition, program details and graduate information allows for computation of per pupil costs and cost-utility ratios. This kind of detailed information is available for only two of the many programs initially selected for study.

Conclusions: Cost-effectiveness analysis is useful in forecasting the costs of new programs over a period of years. The model utilized by the author, while complex and lengthy, obtains meaningful information. Automated methods of performing cost studies allow for more comprehensive and precise treatment of data.

Lecht, L. Evaluating vocational education - policies and plans for the 1970's. New York: Praeger, 1974.

Purpose: To familiarize the reader with the numerous activities and developments that have and are taking place in assessing vocational education.

Method: A broad orientation to national efforts at upgrading and strengthening vocational education. Generally concerned with clarifying vocational education characteristics and levels as they relate to assessment efforts. The influence of the federal government in the promotion and evaluation of vocational education across the country is noted. The role of state governments orients the reader to the increasing value placed on vocational education to attract new industry. Reference to studies conducted by governmental and private sources supports the author's observations.

Commentary: A very informative presentation of the important events occurring in vocational education, their development and some of the people and groups prominent in promoting evaluation techniques. Contains an annotated bibliography.

Lee, A. M., & Fitzgerald, D. (Eds.). Learning a living: Career education in Arizona. Phoenix, Ariz.: Occupational Research Coordinating Unit, 1970. (ERIC Document Reproduction Service No. ED 047 105)

Purpose: To report on research effort to compile all data available concerning career education in Arizona.

Method: Data collected over a three year period from schools, universities, business and industrial organizations, state agencies and working committees. The data is presented in historical perspective, citing the several federal acts that have contributed to the growth of vocational education in the state. Discussion of the various vocational programs offers the reader a verbal and visual view.

Conclusions: Despite impressive development of vocational education in the state, much remains to be done in identifying the students most likely to benefit from such education.

Lindeman, E. L. *Financing vocational education in the public schools*. *National Education Finance Project Special Study* No. 4. Los Angeles: Graduate School of Education, University of California, 1970. (ERIC Document Reproduction Service No. ED 052 517)

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Commentary: The Reinhart and Blomgren report is a compilation of information concerning cost-benefit analysis and its applicability to vocational education. It presents the concept clearly and within the larger framework of systems analysis. Two cost benefit studies are reviewed and a preview of a possible cost benefit analysis study is presented. All of the information in the report serves as an excellent introduction to cost benefit analysis and should be read first by the novice.

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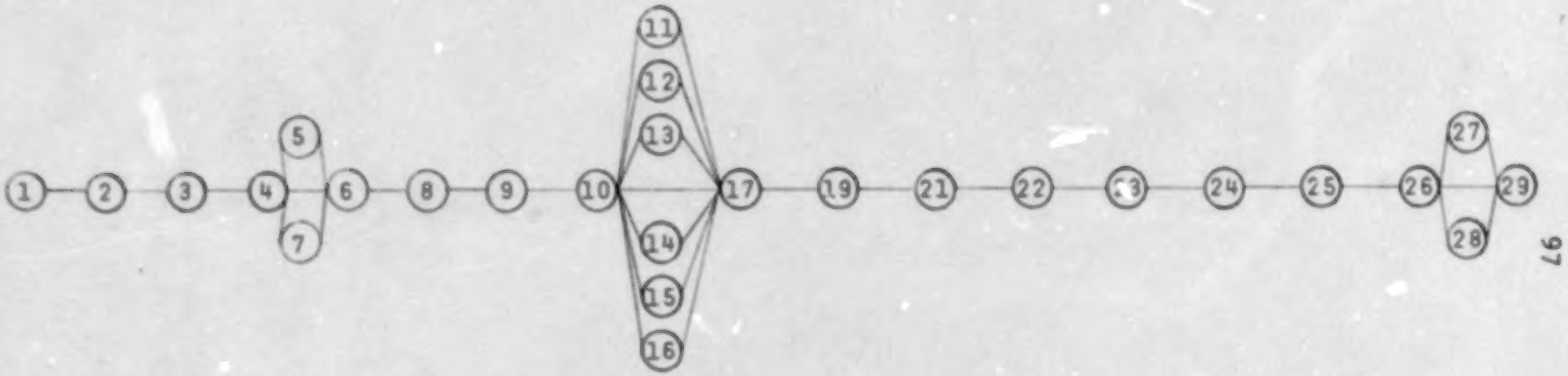
APPENDIX F

FLOW CHART OF TASKS

DATE	EVENT	DESCRIPTION
January 1	1	Start
7	2	Proposal written
15	3	Proposal approved
17	4	Computer search
20	5	Staff selected
20	6	Staff oriented
20	7	Internship letter submitted
February 14	8	Funding received
27	9	Advisory committee confirmed
March 10	10	1st draft of review of literature
11	11	Interviews to determine cost variables
11	12	Determining types of vocational programs
11	13	Determining types of schools
11	14	Determining demographic data
11	15	Determining thorough & efficient components
11	16	Matrix developed
11	17	Advisory committee meeting
13	18	Determine priority counties and schools
13	19	Determine priority vocational programs
13	20	Secure suggestions for methodology
13	21	Formulas for each type of data assembled
21	22	Secure permission to collect data
21	23	Methodology determined
April 8	24	Review of literature completed and annotated bibliography
10	25	Pilot data completed
May 9	26	Data analysis
22	27	Revision of methodology
29	28	1st draft of report
29	29	Final draft submitted to State Department of Vocational Education
June 30		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FLOW CHART
TASK FOR COST PER PUPIL PROJECT

APPENDIX G

COST OF UTILITIES-ELECTRICITY

COST OF UTILITIES-ELECTRICITY[1]

Due to time constraints the computation of utility cost to the programs under investigation has not been accurately determined. The exact cost of lighting a classroom can be determined by contacting the local utility company sales engineer and obtaining the information provided square feet of space under consideration is known and total hours of usage in any given period of time has been computed.

In lieu of this kind of accuracy, certain rules of thumb will provide a satisfactory approximation of cost of electricity as follows:

A. Classroom lighting

* Standard classroom lighting = 100 footcandles

* 100 footcandles = 5 watts/square foot

1. Square foot of area x 5 = total watts for area
2. Total watts for area ÷ 1000 = Kilowatts (KW) for the area
3. Total hours of electricity use/time period x KW = Total KW hours of usage (KWh)
4. Total KWh of usage x rate/KWh = Cost of electricity/time unit

Example

PSGE rate = 5¢/KWh
JCPL rate = 4½¢/KWh
Square feet of PN classroom = 1659
lighting usage = 2 hrs. & 15 min./day x 180 days
= 405 hrs. per school year

1. 1659 x 5 = 8295 watts for area
2. 8295 ÷ 1000 = 8.295 = 8.3 KW for area
3. 405 x 8.3 = 3361.5 KWh for year
4. 3361.5 x .045 = $151.27 Cost of electricity for lighting classroom space of 1659 square feet for 405 hr./school year

---

[1] Source of information: Sales engineer, Elizabeth N. J. office of Public Service Electric and Gas Co., June 12, 1975.

B. Operating Electrical Machinery

* Most machines including small electrical hand tools have on them information that provides their voltage and ampere consumption. Some may also identify their consumption of electricity in terms of watts. If not, it may be obtained by multiplying voltage by amperes.

* Determine the amount of time per hour the machine is used and multiply this the total time period under consideration.

Example

1. 200 hours usage x 100 watts (from information on machine) = 20,000 watt hours of machine usage

2. 20,000 ÷ 1000 = 20 KWh of machine usage in a given time period

3. 20 x .045 = 90¢ cost of electricity for machine usage

APPENDIX H

HEALTH OCCUPATIONS PROGRAM PROGRAM BUDGETING AND PROGRAM ACCOUNTING SYSTEM

GENERAL CHART OF EXPENDITURES

School District ______________________________

Contact Person ______________________________

Phone Number ______________________________

School Year 1974-75

Address ______________________________

DIRECTIONS

1. Make contact with the school Business Manager or other authorized personnel and secure a copy of the total expenditures.

2. List each expenditure on the forms provided. Decide if the expenditure should be placed at the District, Building, Vocational Building, or Program Level. (Use a separate form for each program.)

3. If the fiscal year is complete, use the total expenditure figure. If the fiscal year is still in progress, use the total of the expenditure to date and outstanding encumbered amount.

4. Each district may have a different account system, so list the identification number as used by each district on the form.

5. After all expenditures have been classified into the categories, have the classification verified by the Business Manager or other authorized person to ensure that the expenditure is charged to the right area.

6. Total the expenditure amount for each classification (District, Building, Vocational Building, and Program), and list the amounts on the summary page.

7. All expenditures have to be included and should be placed as accurately as possible into one of the categories.

8. The amount of total expenditures listed on the summary sheet should agree with the total expenditures listed in the chart of accounts.

9. If all programs are listed on the summary sheet, please specify ALL. If a specific program total is listed, please specify the name of the program.

KEY TO FINANCIAL ACCOUNTING NUMBERS USED FOR PROGRAM BUDGETING AND ACCOUNTING SYSTEM

Fund Project

1. General
2. Special Revenue
   - Title I
   - Title II
   - Voc. Ed.
3. Trust & Agency
4. Debt Service
5. Capital Project
   - New Construct.
6. Food Service
7. Pupil Activity
8. General Fixed Assets
9. General Long Term Debt

Type of Account

1. Revenue
2. Expenditure
7. Assets
8. Liabilities
9. Fund Balance

Location

1. District
2. Overbrook Jr.
3. Overbrook Sr.
4. Edgewood Jr.
5. Edgewood Sr.

Program

102	Art
104	Distributive ed.
105	Eng. Lang. Arts
106	Foreign Language
107	Health Occupations
108	Health/Phys. Ed.
109	Home Economics
110	Industrial Art
110.1	Electronics
110.2	Graphics
110.3	Mech. Drawing
110.4	Metal Shop
110.5	Power Mechanics
110.6	Woodshop
111	Mathematics
112	Music
113	Natural Science
114	Office Occupations
115	Social Sci./Soc. Stud.
117	Trade & Industrial
117.1	Automotive
117.2	Building
117.3	Cloth Tech.
117.4	Commercial Foods
117.5	Coop. & Indust.
117.6	Cosmetology
117.7	Drafting
117.8	Electrical
117.9	Machine
117.10	Printing
120	Co-Curricular Activities
120.1	Athletics
120.2	Drama/Stage
120.3	Drill Squad
120.5	Other/Misc.
121	Safety/Driver Ed.
215	Educable
230	Bedside Instruction
220	Trainable
265	Emotionally Dist.
270	Socially Maladjusted
280	Resource Room
285	Learning Disb. (Inc. Read. & Speech)

Program (Continued)

310	Adult Basic Ed. (GED)
360	Adult Spec. Int. (Reg)
510	Curr. Supv. & Develop.
520	Instr. Staff Training
530	Library
540	Media (AVA)
610	Attendance
620	Guidance
630	Health Service
640	Child Study
705	Board of Education
710	District Wide Adm.
715	School Admis.
720	Plan. Eval.
725	Fac. Acq. & Constr.
730	Fiscal Services
735	Food Services
740	Internal Serv.
750	Oper. & Maint. Plant
755	Pupil Transp.
760	Staff Services
765	Statistical Serv.
770	Data Processing
810	Community Recreation
910	Tuition to Other Schools

Classification

Salaries

110	Regular Salaries
120	Temporary Salaries

Employee Benefits

210	Social Security
220	Workmen's Compt.
230	Group Health
240	Life Insurance
250	Pension Contrib.
270	Tuition Reimburse.
280	Sabbatical Leave
290	Other Emp. Benefits

Purchased Service

310	Prof. & Technical Serv.
320	Property Services
321	Public Utilities Serv.
322	Cleaning Services
323	Repairs & Maint. Serv.
324	Property Insurance
325	Rentals

Purchased Services

331	Pupil Transportation
332	Travel & Expenses
341	Telephone & Telegraph
342	Postage
350	Advertising
360	Printing & Binding
370	Tuition
390	Other Purchased Serv.

Supp. Mat. & Equipment

410	Supplies
420	Textbooks
430	Library Books
440	Periodicals
450	Inventory Adj.
461	New Equipment
462	Replace. Equipment
470	Vehicles
490	Other

Capital Outlay

510	Land
520	Buildings
530	Improvements
540	Equipment
550	Vehicles
590	Other

Other Objects

610	Redemption of Prin.
620	Interest
640	Dues & Fees
651	Liability Insurance
652	Fidelity Bond Prem.
653	Judge. Against School
690	Misc. Objects

Transfers

710	Fund Modifications
720	Transits
790	Other Transfers

(5-22-74)

School Year 1974-75

School District ____________________

DISTRICT LEVEL

1. Please use one form for each program.
2. Please specify program Health Occupations.

Identification Number	Item Description		Amount
230:	Bedside Information		11,922.50
:110	Reg. Sal.	16,922.50	
285:	Learning disabilities		8,972.27
:110	Reg. Sal.	8,700.00	
:410	Supplies	272.27	
510:	Curric. & Supervision		10,085.04
:110	Reg. Sal.	10,085.04	
540:	Media		4,527.00
:640	Dues & Fees	4,527.00	
630:	Health Services		1,267.00
:310	Prof. & Tech. Services	1,267.00	
640:	Child Study		51,680.68
:110	Reg. Sal.	507.60	
:120	Temp. Sal.	137.76	
:332	Travel & Exp.	256.40	
:410	Supplies	346.48	
:420	Textbooks	400.00	
:440	Periodicals	41.64	
:461	New Equip.	118.40	
:640	Dues & Fees	20.00	
705:	Bd. of Education		52,070.25
:110	Reg. Sal.	24,662.92	
SUB TOTAL			$140,524.74

School Year 1974-75

School District ____________

DISTRICT LEVEL

1. Please use one form for each program.

2. Please specify program Health Occupations.

Identification Number	Item Description		Amount
705:290	Misc. Employee Benefits	1,406.00	1,406.00
:310	Prof. & Tech. Services	14,897.60	
:332	Travel & Exp.	7,104.81	
:342	Postage	45.00	
:350	Advertising	278.56	
:390	Other	1,268.52	
:410	Supplies	906.84	
:640	Dues & Fees	3,124.00	
:652	Liability Bond Prem.	255.00	
710:	District Wide Adm.		113,778.21
:110	Reg. Sal.	69,054.00	
:120	Temp. Sal.	168.20	
:323	Repairs	1,212.73	
:325	Rentals	5,773.35	
:332	Travel & Exp.	1,924.07	
:341	Pub. Util. Inv.	3,585.10	
	Telephone & Telegraph	1,000.00	
:342	Postage	2,349.22	
:410	Supplies	27,514.83	
710:461	New Equip.	1,408.53	
:640	Dues & Fees	409.00	
730:	Fiscal Services		311,576.65
SUB TOTAL			$426,760.86

School Year 1974-75

School District ____________________

DISTRICT LEVEL

1. Please use one form for each program.

2. Please specify program Health Occupations .

Identificacion Number	Item Description		Amount
730:110	Reg. Sal.	87,425.00	
:120	Temp. Sal.	1,835.77	
:210	Soc. Sec.	45,009.40	
:230	Group Health	150,379.70	
:290	Misc. Empl. Ben.	45,041.46	
:310	Prof. & Tech. Services	4,500.00	
:390	Other Purch. Services	2,271.17	
:410	Supplies	53.90	
:690	Misc. Obj.	324.25	
735:	Food Services		5,000.00
:640	Dues & Fees	5,000.00	
750:	Operation & Main. of Plant		56,788.35
:110	Reg. Sal.	11,500.00	
:120	Temp. Sal.	144.45	
:323	Rep. & Main. Services	73.90	
:324	Prop. Ins.	44,175.00	
:461	New Equip.	895.00	
:462	Rep. of Equip.	5,000.00	
755:	Pupil Trans. Services		670,920.71
:110	Reg. Sal.	23,900.00	
:120	Temp. Sal.	3,069.09	
:290	Mis. Emp. Ben.	1,736.00	
SUB TOTAL			$732,709.06

School Level 1974-75

School District ____________________.

DISTRICT LEVEL

1. Please use one form for each program.

2. Please specify program Health Occupations.

Identification Number	Item Description		Amount
:323	Rep. & Main. Services	1,108.73	
:324	Prop. Ins.	1,000.00	
:331	Pupil Trans.	635,764.53	
:410	Supplies	6,089.66	
:470	Vehicles	6,000.00	
810:	Community Recreation		2,590.25
:640	Dues & Fees	2,590.25	
910:	Tuition		53,036.30
:370	Tuition	53,036.30	
530:000	Library		28,461.60

SUB TOTAL	84,088.15
TOTAL DISTRICT LEVEL EXPENDITURES	$1,384,082.81

Program Health Occupations School Year 1974-75

School District ______________________

BUILDING LEVEL EXPENDITURES

Identification Number	Item Description		Amount
610:	Attendance		1,530.00
620:	Guidance		55,863.71
:110	Salary	55,386.00	
:410	Supplies	414.75	
:440	Periodicals	35.00	
:640	Dues	28.00	
630:	Health Services		16,768.20
:110	Salaries	15,475.00	
:310	Prof. & Tech. Ser.	6.04	
:323	Rep. & Main.	57.50	
:410	Supplies	631.70	
715:	Administration		115,167.92
:110	Salaries	91,947.25	
:120	Temp. Sal.	6,047.70	
:323	Rep. & Main.	301.53	
:325	Rentals	3,068.31	
:331	Pupil Trans.	3,000.00	
:332	Travel & Expen.	1,470.88	
:341	Telephone & Telegraph	5,504.90	
:342	Postage	1,220.15	
:360	Printing & Binding	715.00	
:410	Supplies	562.30	
:461	New Equipment	2,322.25	
:462	Replaced Equip.	360.00	
SUB TOTAL			$189,329.83

Program Health Occupations School Year 1974-75

School District

BUILDING LEVEL EXPENDITURES

Identification Number	Item Description		Amount
715:640	Dues & Fees	742.65	
750:	Operation & Maintenance		197,460.21
:110	Salaries	83,232.56	
:120	Temp. Sal.	65,000.00	
:290	Emp. Ben.	20,770.75	
:321	Gas 947.13) Elec. 37,991.56)	38,938.69	
:323	Rep. & Main.	22,687.88	
:390	Other Purchased Services	405.00	
:410	Supplies	36,904.92	
:461	New Equip.	8,558.56	
:462	Replacement Equip.	202.50	
770:310	Prof. & Tech. Ser.		5,000.00
SUB TOTAL			202,460.21
TOTAL BUILDING LEVEL EXPENDITURES			$391,790.04

Program Health Occuaptions School Year 1974-75

School District

VOCATIONAL BUILDING LEVEL

Identification Number	Item Description		Amount
510:	Supervision		72,592.79
:110	Salaries	71,327.60	
:410	Supplies	224.94	
:640	Dues	15.00	
:690	Misc.	1,025.25	
TOTAL VOCATIONAL BUILDING EXPENDITURES			$72,592.79

School Year 1974-75

School District ______________________

PROGRAM EXPENDITURES

1. Please use one form for each program.

2. Please specify program Health Occupations.

Identification Number	Item Description	Amount
107:110	Reg. Salaries	15,511.00
:323	Repairs & Maintenance	23.68
:410	Supplies	1,305.35
:420	Text Books	307.62
610:290	Employee Benefits	2,326.65
:332	Travel	250.00
107:540	Equipment	308.00

TOTAL PROGRAM EXPENDITURES $20,032.30

District: ______________________

School: ______________________

School Year: 1974-75

Program: ______________________

EQUIPMENT COSTS

Quantity	Description	Year Purchased	Cost* Per Year	Total Cost
1	Kitchen Unit Base	5-4-71	$125.00	$500.00
1	Dryer, Electric	8-29-73	$ 65.00	$129.00
4	Hospital Beds	6-12-69	$ 36.00	$219.00
1	Washer, Automatic Heavy Duty	8-29-73	$ 82.00	$164.00
	Total		$308.00**	

*Cost Per Year = $\frac{\text{Total Cost}}{\text{Number of Years in Service}}$

**See 107:540 Equipment in Program Expenditures for this total

School District ______________________________

School Year 1974-75

SUMMARY OF EXPENDITURES

1. District Expenditures	$1,384,082.81
2. Building Level Expenditures	$ 391,790.04
3. Vocational Building Level Expenditures	$ 72,592.79
4. Program Expenditures	$ 20,032.30
(Please specify program) (Health Occupations)	
Total Expenditures (Add 1, 2, 3, 4)	$1,868,497.94

School Year 1974-75

Program Health Occupations

DISTRICT ______ SCHOOL ______

NAME OF TEACHER	AVERAGE DAILY ENROLLMENT	CLASS HOURS PER WEEK	NUMBER OF WEEKS/YR.	NUMBER OF SCHOOL DAYS/YR.
Teacher A)	24	15	36	180
Teacher B)				

School Year 1974-75

Program Health Occupations

SCHOOL DISTRICT ______ SCHOOL BUILDING ______

TOTAL NUMBER OF STUDENTS ENROLLED IN VOCATIONAL TECHNICAL EDUCATION 802

TOTAL NUMBER OF TEACHERS IN VOCATIONAL TECHNICAL EDUCATION 21.5

TOTAL NUMBER OF PROGRAMS IN VOCATIONAL TECHNICAL EDUCATION 13

TOTAL SQUARE FEET OF AREA USED IN VOCATIONAL TECHNICAL EDUCATION 190,000

NAME OF PROGRAM	NUMBER OF TEACHERS	NUMBER OF STUDENTS	SQUARE FEET USED
Health Occupations	1.5	24	864.

SCHOOL DISTRICT ______________________ SCHOOL YEAR 1974-75

ENROLLMENT INFORMATION

	AVERAGE DAILY ATTENDANCE	AVERAGE DAILY ENROLLMENT
I. DISTRICT	4117.6	4690.0
II. BUILDING LEVEL SCHOOL - APPENDIX A	891.8	1019.7
III. VOCATIONAL BUILDING LEVEL	432.4	506.8
IV. PROGRAM LEVEL HEALTH OCCUPATIONS	22.0	24.0

School: ____________ School Year: 1974-75

Program: Health Occupations

Computation of Cost Per Pupil Per Program Per Type of School Average Daily Enrollment (A.D.E.)

1. District Per Pupil Cost =

$$\frac{\text{Total District Level Expenditures}}{\text{A.D.E.}} =$$

$$\frac{\$1,384,082.81}{4690.0} = \$295.11$$

2. Building Per Pupil Cost =

$$\frac{\text{Total Building Level Expenditures}}{\text{A.D.E.}} =$$

$$\frac{\$391,790.04}{1019.7} = \$384.22$$

3. Vocational Building Per Pupil Cost =

$$\frac{\text{Total Vocational Building Level Expenditures}}{\text{A.D.E.}} =$$

$$\frac{\$72,592.79}{506.8} = \$143.24$$

4. Program Per Pupil Cost = $\frac{\text{Total Program Expenditures}}{\text{A.D.E.}}$ =

$$\frac{\$20,032.30}{24.0} = \$834.68$$

Total Per Pupil Cost $1,657.25 (addition 1, 2, 3, 4 above)

Total Program Cost = Total Per Pupil Cost x A.D.E.
$1,657.25 x 24 = $39,774.00

School: ____________ School Year: 1974-75

Program: Health Occupations

Computation of Total Per Pupil Cost Percentage Average Daily Enrollment (A.D.E.)

1. $$\frac{\text{District Level Per Pupil Cost}}{\text{Total Per Pupil Cost}} = \text{Percent of total per pupil cost}$$

$$\frac{295.11}{1,657.25} = 18\%$$

2. $$\frac{\text{Building Level Per Pupil Cost}}{\text{Total Per Pupil Cost}} = \text{Percent of total per pupil cost}$$

$$\frac{384.22}{1,657.25} = 23\%$$

3. $$\frac{\text{Vocational Building Level Per Pupil Cost}}{\text{Total Per Pupil Cost}} = \text{Percent of total per pupil cost}$$

$$\frac{143.24}{1,657.25} = 9\%$$

4. $$\frac{\text{Program Level Per Pupil Cost}}{\text{Total Per Pupil Cost}} = \text{Percent of total per pupil cost}$$

$$\frac{834.68}{1,657.25} = 50\%$$

Total 100%

School: ____________________ School Year: 1974-75

Program: Health Occupations

Computation of Cost Per Pupil Per Program Per Type of School Average Daily Attendance (A.D.A.)

1. District Per Pupil Cost =

$$\frac{\text{Total District Level Expenditures}}{\text{A.D.A.}} =$$

$$\frac{\$1,384,082.81}{4117.6} = \$336.14$$

2. Building Per Pupil Cost =

$$\frac{\text{Total Building Level Expenditures}}{\text{A.D.A.}} =$$

$$\frac{\$391,790.04}{891.8} = \$439.33$$

3. Vocational Building Per Pupil Cost =

$$\frac{\text{Total Vocational Building Level Expenditures}}{\text{A.D.A.}} =$$

$$\frac{\$72,592.79}{432.4} = \$167.88$$

4. Program Per Pupil Cost = $\frac{\text{Total Program Expenditures}}{\text{A.D.A.}}$ =

$$\frac{\$20,032.30}{22} = \$910.56$$

Total Per Pupil Cost $1,853.91 (add items 1, 2, 3 & 4 above)

Total Program Cost = Total Per Pupil Cost x A.D.A.
$1,833.49 x 22 = $40,786.02

School: ____________ School Year: 1974-75

Program: Health Occupations

Computation of Total Per Pupil Cost Percentage
Average Daily Attendance (A.D.A.)

1. $\frac{\text{District Level Per Pupil Cost}}{\text{Total Per Pupil Cost}}$ = Percent of total per pupil cost

   $\frac{336.14}{1,853.91} = 18\%$

2. $\frac{\text{Building Level Per Pupil Cost}}{\text{Total Per Pupil Cost}}$ = Percent of total per pupil cost

   $\frac{439.33}{1,853.91} = 24\%$

3. $\frac{\text{Vocational Building Level Per Pupil Cost}}{\text{Total Per Pupil Cost}}$ = Percent of total per pupil cost

   $\frac{167.88}{1,853.91} = 9\%$

4. $\frac{\text{Program Level Per Pupil Cost}}{\text{Total Per Pupil Cost}}$ = Percent of total per pupil cost

   $\frac{910.56}{1,853.91} = 49\%$

Total 100%

APPENDIX I

PRACTICAL NURSING PROGRAM TRADITIONAL ACCOUNTING SYSTEM

132

GENERAL CHART OF EXPENDITURES

School District ______________________________

Contact Person ______________________________

Phone Number ______________________________

School Year ____________ 1973-74 ____________

Address ______________________________

DIRECTIONS

1. Make contact with the school Business Manager or other authorized personnel and secure a copy of the total expenditures.
2. List each expenditure on the forms provided. Decide if the expenditure should be placed at the District, Building, Vocational Building, or Program Level. (Use a separate form for each program.)
3. If the fiscal year is complete, use the total expenditure figure. If the fiscal year is still in progress, use the total of the expenditure to date and outstanding encumbered amount.
4. Each district may have a different account system, so list the identification number as used by each district on the form.
5. After all expenditures have been classified into the categories, have the classification verified by the Business Manager or other authorized person to ensure that the expenditure is charged to the right area.
6. Total the expenditure amount for each classification (District, Building, Vocational Building, and Program), and list the amounts on the summary page.
7. All expenditures have to be included and should be placed as accurately as possible into one of the categories.
8. The amount of total expenditures listed on the summary sheet should agree with the total expenditures listed in the chart of accounts.
9. If all programs are listed on the summary sheet, please specify ALL. If a specific program total is listed, please specify the name of the program.

School Year 1973-74 Program Practical Nursing

School District

DISTRICT LEVEL

Identification Number	Item Description	Amount
2500:200	Travel	8,150.79
:600	Courses Prof.	16,304.29
:800	Misc. Exp.	1,595.39
3100:102	Sal. Attend.	7,769.41
4100:200	Sal. Physic.	4,499.92
:300	Sal. Nurses	14,543.00
:400	Sal. Clerk	11,438.92
4200:100	Health Supplies	1,496.74
:200	Health Travel	3.30
:300	Health Misc.	2,002.75
5100:100	Trans. Sup.	6,911.33
:200	Trans. Sect.	3,187.14
:300	Reg. Sal. Bus.	93,339.24
:401	Sub. Driver	3,920.66
:500	Sal. Activity Bus.	8,086.39
:600	Sal. Field Trip	5,179.78
:700	Field Trip	738.00
:800	Sal. Ath.	5,009.00
:900	Athletic	15.28
5101:300	Sal. Mech.	5,950.33
:400	Asst. Mech.	3,723.18
SUB TOTAL		$203,864.84

School Year 1973-74 Program Practical Nursing

School District ______________________

DISTRICT LEVEL

Identification Number	Item Description	Amount
5101:500	Mech. Help.	122.90
5300:100	Replacement Veh.	12,173.52
5350:000	Purchased New	2,669.00
:100	Trans.	1,685.11
5400:000	Insurance	7,293.66
:100	Gas	24,718.57
:200	Lub & Oil	369.35
:300	Tire	2,606.35
:400	Repairs & Parts	3,781.68
:500	Driver Physical	392.50
5500:700	Misc. Petty	664.73
:800	Garage Misc.	1,327.66
6100:100	Sal. Custodial	114,705.02
:200	Cus. Sal. Extra	36,873.35
:400	Sal. Police	140.00
6200:400	Contracted Sal.	2,945.75
6300:100	Heat Fur.	42,725.14
:200	Heal Elect.	61,414.77
6300:300	Heat Gas	664.13
13211:100	Principal 1st Bond	95,000.00
:200	Principal 2nd Bond	80,000.00

SUB TOTAL	$492,273.19

School Year 1973-74 Program Practical Nursing

School District ______________________

DISTRICT LEVEL

Identification Number	Item Description	Amount
13211:300	Principal 3rd Bond	150,000.00
133:100	Interest 1st Bond	17,133.85
:200	" 2nd Bond	22,680.00
:300	" 3rd Bond	152,327.00
6400:100	Water	5,316.05
:205	Elect.	12,206.08
:300	Gas Cook	1,325.30
:400	Telephone	17,293.45
6500:100	Custodial Supply	7,949.96
:100	Other	811.65
7100:100	Sal. Maint.	11,379.72
7200:100	Cont. Serv.	7,072.54
:200	Cont. Serv. Repair	4,816.70
:305	General	6,004.57
:306	Guidance	2,320.00
:328	Library	704.91
8100:100	Pension	23,687.70
:200	Social Sec.	30,520.72
8200:100	Property Ins.	9,763.08
:200	Work Comp.	8,398.03
:300	Emp. Health Ins.	72,405.11
:400	Student Athletic Ins.	6,430.70
:500	Fidelity Bond	310.00
:600	Liability Ins.	5,377.34
SUB TOTAL		$576,234.46

School Year 1973-74 Program Practical Nursing

School District

DISTRICT LEVEL

Identification Number	Item Description	Amount
8200:700	Other Ins.	4,367.08
8700:100	Tuition	26,140.46
9300:000	Cafeteria	6,559.46
1010:0100	Sal. Ex. Curr.	77,643.71
10200:100	Athletic Supp.	27,461.45
10210:200	Ex. Curr. Supp.	1,438.29
10300:100	Lamp Acct.	1,500.00
12200:300	Site Improvement	3,005.40
12300:100	Build Imp.	31,199.04
12300:110	Storage Bldg.	1,755.51
2160:000	Curr. Research	13,959.97
01100:200	Board Secretary	7,046.76
:300	Custodial	2,171.88
:600	Superintendent	27,693.84
:800	Asst. Supt.	24,870.86
:900	Admin. Secty.	32,192.80
1101:000	Sal. Public Rel.	19,424.88
1400	Sal. Computer	15,882.37
1480	Data Processing	153.82
1200:100	Audit	38.65
:200	Legal Fees	3,583.95
:400	Sal. Other Adm.	4,763.00
1300:100	Exp. Bd. of Ed. Memb.	5,003.25
:200	Other Exp.: Bd. Secty.	2,227.83
SUB TOTAL		$340,084.26

School Year 1973-74 Program Practical Nursing

School District

DISTRICT LEVEL

Identification Number	Item Description	Amount
1300:300	Postage	5,305.76
:400	School Elect.	413.50
:600	Travel Supt.	1,139.81
:700	Petty Cash	260.00
1301:300	Printing	821.27
:400	Misc.	2,366.96
SUB TOTAL		10,309.30
TOTAL DISTRICT LEVEL EXPENDITURES		$1,622,764.05

School Year 1973-74 Program Practical Nursing

School District

BUILDING LEVEL EXPENDITURES

Identification Number	Item Description	Amount
7400:100	Misc. Maint. Exp.	3,006.10
2110:000	Salary House Master	74,147.48
2120:000	Supt. of Inst.	41,724.76
2130:200	Bedside	5,931.25
2140:128	Sal. Sch. Library	18,300.00
:206	Sal. Dir. Stud. Person	24,149.90
:306	Sal. Guidance	125,663.12
:400	Sal. Special Ser.	36,647.55
:844	Sal. Radio Staff	17,000.00
2150:100	Sal. Clerks Inst.	59,556.92
:228	Sal. Clerks Library	19,865.44
:306	Sal. Clerks Guid.	13,648.53
2400:000	Teaching Supplies	103,572.98
2500:205	General Travel	336.50
2500:206	Guidance Travel	136.47
2400:030	Special Service	52.03
2300:128	Library Books & A.V.	10,958.05
:228	Library Periodical	5,905.17
:328	A.V. Materials	14,494.32
SUB TOTAL		$575,096.57

School Year 1973-74 Program Practical Nursing

School District

BUILDING LEVEL EXPENDITURES

Identification Number	Item Description	Amount
2300:528	Other Library Equip.	4,101.83
:628	Check Point Rental	2,862.00
2500:228	AVA Travel	166.44
:230	Special Ser. Travel	311.73
2500:280	Computer Travel	702.31
2500:400	Commencement	4,404.45
2501:144	Consult Serv. Radio	4,475.01
7200:300	Contracted Repair	14,678.72
:100	Replace Inst. Equip.	5,660.76
:200	Replace Non Ins. Equip.	78.00
7300:300	New Inst. Equip.	51,441.07

SUB TOTAL	$88,882.32
TOTAL BUILDING LEVEL EXPENDITURES	$663,978.89

School Year 1973-74 Program Practical Nursing

School District

VOCATIONAL BUILDING LEVEL

Identification Number	Item Description	Amount
2400:045	Career Supplies	280.62
2400:041	Gen. Vocational Supplies	622.13
2400:341	Voc. General Repairs	130.72
2500:241	Voc. Gen. Travel	322.07
2500:245	Career Travel	389.87
6300:201	Voc. Elect.	15,111.57
7301:300	New Voc. Equip.	5,139.01
7302:305	Non-Inst. Equip. Gen.	2,173.75
12300:300	Greenhouse	10,083.75
	Director's Salary	19,919.00

TOTAL VOCATIONAL BUILDING LEVEL EXPENDITURES $54,172.49

School Year 1973-74

School District

PROGRAM EXPENDITURES

1. Please use one form for each program.

2. Please specify program Practical Nursing.

Identification Number	Item Description	Amount
2200:039	Textbooks	283.55
	Salaries	11,427.00
2400:039	Supplies	2,007.62
2500:239	Travel	204.98
7301:339	Equipment	1,210.44

TOTAL PROGRAM EXPENDITURES $15,133.59

District: ______________________

School: ______________________

School Year: 1973-74

Program: Practical Nursing

EQUIPMENT COSTS

Quantity	Description	Year Purchased	Cost Per Year	Total Cost
6	Hospital Beds, Mattress, Rails	8-22-67	$265.71	$1,860.00
1	Teaching Doll	8-19-67	$ 31.07	$ 217.50
1	Model Torso	12-6-67	$ 68.57	$ 480.00
1	Dressing Cart	12-20-67	$ 27.43	$ 192.00
1	Baby Bassinet	11-21-67	$ 24.28	$ 170.00
1	Wheelchair	8-17-67	$ 16.86	$ 118.00
1	Stretcher with Pad	8-17-67	$ 19.29	$ 135.00
1	Medicine Cabinet	8-17-67	$ 32.14	$ 225.00
1	Refrigerator	8-17-67	$ 27.14	$ 190.00
1	Sterilizer, Electric	8-17-67	$ 19.29	$ 135.00
1	Movie Projector	9-21-67	$ 69.14	$ 484.00
1	Film Strip Projector	9-21-67	$ 16.25	$ 113.75
1	Skelton & Cabinet	12-20-67	$ 49.28	$ 345.00
4	Crutches	9-12-67	$ 69.71	$ 488.00
2	Teachers Desk	8-18-67	$ 51.00	$ 357.00
3	Filing Cabinets		$100.00	$ 300.00
1	Washer		$ 39.71	$ 220.00
1	Dryer		$ 25.71	$ 180.00
1	Stove		$ 32.14	$ 225.00
1	Typewriter		$ 71.43	$ 500.00
4	Microscopes		$154.29	$1,080.00
	Total		$1,210.44*	

*See 7301:339 Program Expenditures for this total.

School District ______________________

SUMMARY OF EXPENDITURES

1.	District Expenditures	$1,622,764.05
2.	Building Level Expenditures	$ 663,978.89
3.	Vocational Building Level Expenditures	$ 54,172.49
4.	Program Expenditures	$ 15,133.59

(Please specify program)
(Practical Nursing)

Total Expenditures (Add 1, 2, 3, 4)	$2,356,049.02

Program Practical Nursing

School Year 1973-74

DISTRICT ____________ SCHOOL ____________

NAME OF TEACHER	NUMBER OF STUDENTS	HOURS PER WEEK	NUMBER OF WEEKS	NUMBER OF SCHOOL DAYS
Instructor A	17	11:15	36	180

School Year 1973-74

SCHOOL DISTRICT ______ SCHOOL BUILDING ______

TOTAL NUMBER OF STUDENTS ENROLLED IN VOCATIONAL TECHNICAL EDUCATION 227.8

TOTAL NUMBER OF TEACHERS IN VOCATIONAL TECHNICAL EDUCATION 7

TOTAL NUMBER OF PROGRAMS IN VOCATIONAL TECHNICAL EDUCATION 7

TOTAL SQUARE FEET OF AREA USED IN VOCATIONAL TECHNICAL EDUCATION 20,709

NAME OF PROGRAM	NUMBER OF TEACHERS	NUMBER OF STUDENTS	SQUARE FEET USED
Practical Nursing	1	17	1659

SCHOOL DISTRICT ______________ SCHOOL YEAR 1973-74

ENROLLMENT INFORMATION

	AVERAGE DAILY ATTENDANCE	AVERAGE DAILY ENROLLMENT
I. DISTRICT	1850.7	2040.9
II. BUILDING LEVEL		
III. VOCATIONAL BUILDING LEVEL	206.6	227.8
IV. PROGRAM LEVEL PRACTICAL NURSING	16	17

School: ____________________ School Year: 1973-74

Program: Practical Nursing

Computation of Cost Per Pupil Per Program Per Type of School Average Daily Enrollment (A.D.E.)

1. District Per Pupil Cost =

$$\frac{\text{Total District Level Expenditures}}{\text{A.D.E.}} =$$

$$\frac{\$1{,}622{,}764.05}{2040.9} = \$\ 795.10$$

2. Building Per Pupil Cost =

$$\frac{\text{Total Building Level Expenditures}}{\text{A.D.E.}} =$$

$$\frac{\$663{,}978.89}{2040.9} = \$\ 325.34$$

3. Vocational Building Per Pupil Cost =

$$\frac{\text{Total Vocational Building Level Expenditures}}{\text{A.D.E.}} =$$

$$\frac{\$54{,}172.49}{227.8} = \$\ 237.80$$

4. Program Per Pupil Cost = $\frac{\text{Total Program Expenditures}}{\text{A.D.E.}}$ =

$$\frac{\$15{,}133.59}{17} = \$\ 890.21$$

Total Per Pupil Cost $2,248.45

Total Program Cost = Total Per Pupil Cost x A.D.E.
$2,248.45 x 17 = $38,223.65

School: ____________________ School Year: 1973-74

Program: Practical Nursing

Computation of Total Per Pupil Cost Percentage
Average Daily Enrollment (A.D.E.)

1. $\frac{\text{District Level Per Pupil Cost}}{\text{Total Per Pupil Cost}}$ = Percent of total per pupil cost

   $\frac{\$\ 795.10}{\$2,248.45} = 35\%$

2. $\frac{\text{Building Level Per Pupil Cost}}{\text{Total Per Pupil Cost}}$ = Percent of total per pupil cost

   $\frac{\$\ 325.34}{\$2,248.45} = 14\%$

3. $\frac{\text{Vocational Building Level Per Pupil Cost}}{\text{Total Per Pupil Cost}}$ = Percent of total per pupil cost

   $\frac{\$\ 238.80}{\$2,248.45} = 11\%$

4. $\frac{\text{Program Level Per Pupil Cost}}{\text{Total Per Pupil Cost}}$ = Percent of total per pupil cost

   $\frac{\$\ 890.21}{\$2,248.45} = 40\%$

Total 100%

School: ____________ School Year: 1973-74

Program: Practical Nursing

Computation of Cost Per Pupil Per Program Per Type of School Average Daily Attendance (A.D.A.)

1. District Per Pupil Cost = Total District Level Expenditures =

   $\frac{\$1,622,764.05}{1850.7} = \$\ 876.84$

2. Building Per Pupil Cost = Total Building Level Expenditures =

   $\frac{\$663,978.89}{1850.7} = \$\ 358.77$

3. Vocational Building Per Pupil Cost = Total Vocational Building Level Expenditures =

   $\frac{\$54,172.49}{206.6} = \$\ 262.21$

4. Program Per Pupil Cost = $\frac{\text{Total Program Expenditures}}{\text{A.D.A.}}$ =

   $\frac{\$15,133.59}{16} = \$\ 945.85$

Total Per Pupil Cost $2,443.67 (add items 1, 2, 3 & 4 above)

Total Program Cost = Total Per Pupil Cost x A.D.A.
$2,443.67 x 16 = $39,098.72

School: ____________ School Year: 1973-74

Program: Practical Nursing

Computation of Total Per Pupil Cost Percentage Average Daily Attendance (A.D.A.)

1. $\frac{\text{District Level Per Pupil Cost}}{\text{Total Per Pupil Cost}}$ = Percent of total per pupil cost

   $\frac{\$\ 876.84}{\$2,443.67} = 36\%$

2. $\frac{\text{Building Level Per Pupil Cost}}{\text{Total Per Pupil Cost}}$ = Percent of total per pupil cost

   $\frac{\$\ 358.77}{\$2,443.67} = 14\%$

3. $\frac{\text{Vocational Building Level Per Pupil Cost}}{\text{Total Per Pupil Cost}}$ = Percent of per pupil cost

   $\frac{\$\ 262.20}{\$2,443.67} = 11\%$

4. $\frac{\text{Program Level Per Pupil Cost}}{\text{Total Per Pupil Cost}}$ = Percent of total per pupil cost

   $\frac{\$\ 945.85}{\$2,443.67} = 39\%$

Total 100%

APPENDIX J

PROJECT STAFF

PROJECT STAFF

Charles R. Doty is presently Adviser in Technical Education in the Department of Vocational and Technical Education, Graduate School of Education, Rutgers, The State University of New Jersey. While in this position he has served as chairman of the New Jersey State sponsored project Performance Evaluation Project. The results of the PEP project are being integrated into the Trenton State College teacher education curriculum. He has served as consultant in various states to secondary schools, community colleges and four year colleges as well as institutions such as Educational Testing Service, Princeton, N.J. He also served as a member of the New Jersey State Advisory Committee on Technology for New Jersey State Department of Higher Education.

Prior to this position he has served as associate project director in the national research center, The Center for Vocational and Technical Education located in Columbus, Ohio. At the Center he worked as a research person on two national based projects, *Model Curricula for Vocational and Technical Teacher Education* and *Assessment of Micro Teaching and Video Feedback on Vocational and Technical Teachers*. Prior to this he served as research associate on the Industrial Arts Curriculum Project, a national curriculum project now published by McKnight & McKnight Publishers.

His educational work experience includes six years as a secondary teacher and seven years teaching at the post-secondary level. The Bachelors and Masters degrees were received from Southern Illinois University, Carbondale, Illinois. The Doctorate (Ph.D.) was awarded from The Ohio State University, Columbus, Ohio.

Additional responsibilities include assistant editor of the *Journal of Industrial Teacher Education*, research chairman for the National Association for Industrial and Technical Teachers Educators, member of the American Vocational Association (AVA) International Education Committee and a position of member at large of the policy committee of the Technical Education Division of the AVA.

Rose R. Kocinski is currently a doctoral student in the Department of Vocational-Technical Education, Graduate School of Education, Rutgers, The State University of New Jersey. Following completion of one year of full-time study, she will return to her teaching position in the Department of Nurse Education, Middlesex County College, Edison, N.J. Prior to her position at Middlesex County College, she has taught nursing at Rutgers College of Nursing, Newark and the Charles E. Gregory School of Nursing, Perth Amboy, N.J. Before going into teaching, she had practiced nursing in the areas of public health, ambulatory and in-patient care facilities.

She is a graduate of the Bellevue School of Nursing, New York City, Hunter College, New York City, and New York University, New York City. She holds membership in the American Nurses Association and the National League for Nursing among other professional organizations.

Albert G. Gasior is presently an EPDA Fellow in the Department of Vocational-Technical Education, Graduate School of Education, Rutgers, The State University of New Jersey. He is an Ed.D. candidate. During his studies at Rutgers, he completed an internship at Glassboro State College in the Department of Industrial Education and Technology.

In the spring of 1974 he received a grant to establish a Career Education Curriculum Development Project. The grant was provided by the New Jersey Curriculum Management Center for Vocational-Technical and Career Education, Rutgers, The State University of New Jersey. The Curriculum Project is entitled. "Agriculture for Little People (K-3)."

Prior to this position he served 2 1/2 years as Supervisor, Manpower Development and Training, County Coordinator of Occupational Education, and Supervisor, Private Trade and Technical Schools in the Division of Vocational Education, New Jersey State Department of Education, Trenton, N.J.

His educational work experience also included two years as a Cooperative Industrial Education Coordinator and two years as an Industrial Arts teacher. He received his Masters and Bachelors degrees from Trenton State College, Trenton, N.J.

Prior to entering into the field of education, he served three years in the United States Marine Corps as a Motor Transport Officer, obtaining the rank of Captain.